CHAPTER 13

ADMINISTRATION AND TRAINING

As you have already discovered, there is much more to being an LPO or LCPO than just telling people what to do. As you advance, you become more knowledgeable about the way your command operates on a daily basis. You also become more involved in the administrative aspects of the management process. This process, of course, goes far beyond 3-M reporting or logging daily magazine temperatures. In this chapter we will acquaint you with some of the more important administrative procedures you may become involved with as a senior Gunner's Mate.

CORRECTIVE MAINTENANCE MANAGEMENT

LEARNING OBJECTIVES: Describe the cause and effect of corrective maintenance.

Many people operate under the philosophy "If it's broke—fix it; if it works—leave it alone." However, this attitude defeats the purpose of discrepancy trend analysis. In other words, you should closely monitor the documented histories of your equipment. You should then be able to predict potential problems or breakdowns based upon your knowledge and familiarity of that equipment. This practice could enable you to spot recurring equipment tendencies and prevent discrepancies before they occur. You are then accomplishing the purpose of performing preventive maintenance.

CURRENT SHIP'S MAINTENANCE PROJECT

One of the best aids in identifying material discrepancy trends is through the use of the Current Ship's Maintenance Project (CSMP). All levels of management can use the CSMP. The work center supervisor, up through the type commander, can use it for such purposes as operational scheduling, overhaul work packages, and availabilities. Above all, they can use it as a means of identifying trouble areas within a particular unit, system, or even component. We will not show you how to maintain a CSMP;, you should already know how to do that. A properly maintained historical record of the equipment you are responsible for may prove to be a highly invaluable tool in its upkeep.

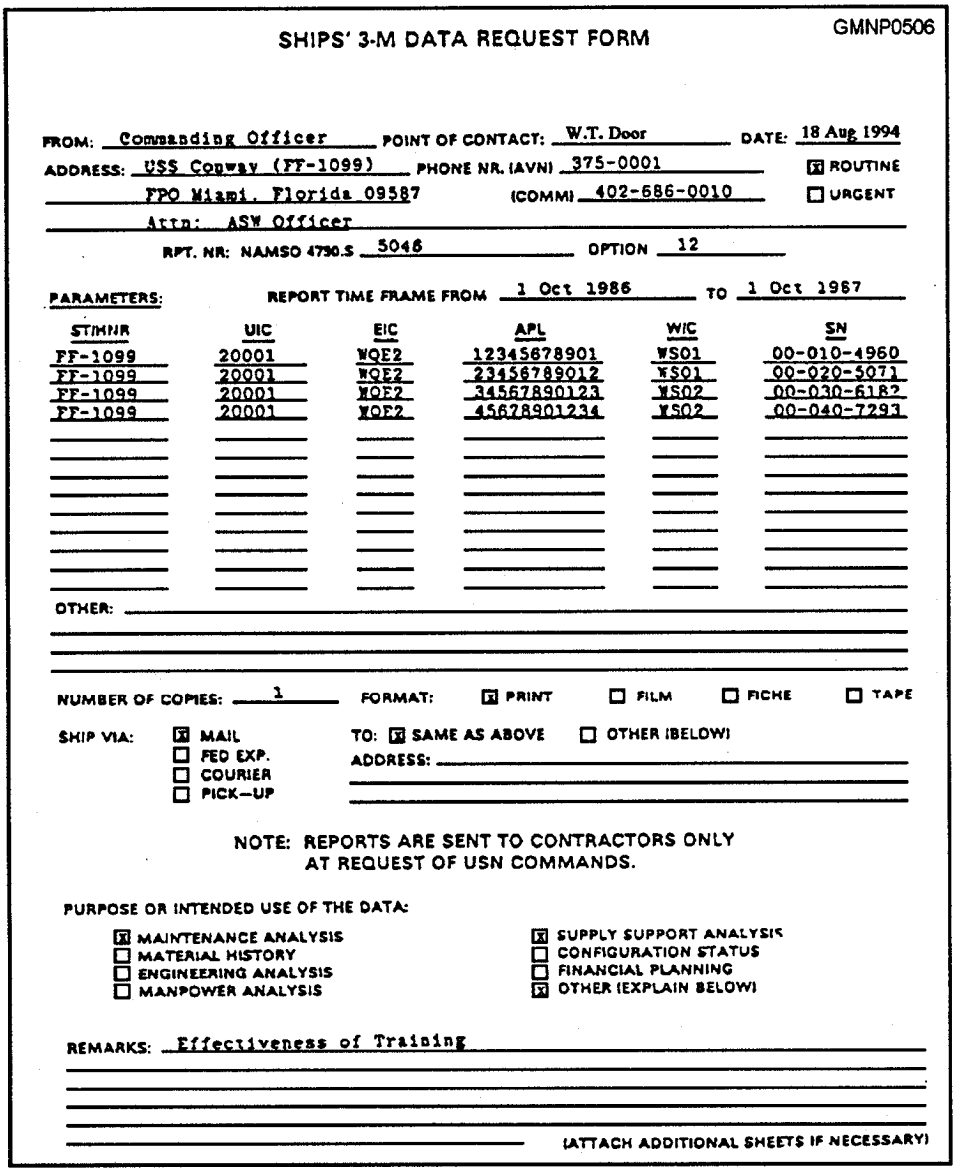
3-M SYSTEMS' CENTRAL DATA BANK

Did you ever wonder where all that data you submit on an OPNAV 4790.2K ends up? One important destination for this information is the 3-M Systems' Central Data Bank located in Mechanicsburg, Pennsylvania. The Naval Maintenance Support Office (NAMSO), which is a subordinate department of the Naval Sea Logistics Center (NAVSEALOGCEN), maintains this data bank. Fleet personnel submit MDS reports, such as work requests, deferrals, configuration changes, and failed-parts reports. They are then entered into this data bank. This data is then made available to whomever requests the information. This bank is the source of most of the 3-M reports that are sent to ships, other levels of naval management, and authorized defense contractors. However, these reports are also available to any requesting naval activity. Figure 13-1 shows a completed request form used to obtain 3-M reports from the central data bank. Detailed instructions on how to fill out this request form, as well as a summary and explanation of what reports are available, are located in chapter 4 of the *Ships' 3-M Manual*, OPNAVINST 4790.4.

SYSTEM LOGS AND RECORDS

Another important tool in heading off equipment problems before they happen is through the review of the various system logs and records. It is impractical to list them here because they are covered in some detail in other training manuals. Instead, two examples are provided here to show how a log or record may aid in the trend analysis process.

> While performing bore erosion checks, you notice what you consider an unusual amount of erosion. In checking the fire control smooth log, you verify that this is true-you have more than the usual amount of bore erosion for a given time period and a given amount of rounds fired through the gun. At this point, you may



SHIPS' 3-M DATA REQUEST FORM

GMNP0506

FROM: Commanding Officer POINT OF CONTACT: W.T. Door DATE: 18 Aug 1994

ADDRESS: USS Conway (FF-1099) PHONE NR. (AVN) 375-0001 ☒ ROUTINE

FPO Miami, Florida 09587 (COMM) 402-686-0010 ☐ URGENT

Attn: ASW Officer

RPT. NR: NAMSO 4790.5 5046 OPTION 12

PARAMETERS: REPORT TIME FRAME FROM 1 Oct 1986 TO 1 Oct 1987

STMNR	UIC	EIC	APL	WIC	SN
FF-1099	20001	WQE2	12345678901	WS01	00-010-4960
FF-1099	20001	WQE2	23456789012	WS01	00-020-5071
FF-1099	20001	WQE2	34567890123	WS02	00-030-6182
FF-1099	20001	WQE2	45678901234	WS02	00-040-7293

OTHER:

NUMBER OF COPIES: 1 FORMAT: ☒ PRINT ☐ FILM ☐ FICHE ☐ TAPE

SHIP VIA: ☒ MAIL ☐ FED EXP. ☐ COURIER ☐ PICK-UP

TO: ☒ SAME AS ABOVE ☐ OTHER (BELOW)

ADDRESS:

NOTE: REPORTS ARE SENT TO CONTRACTORS ONLY AT REQUEST OF USN COMMANDS.

PURPOSE OR INTENDED USE OF THE DATA:

☒ MAINTENANCE ANALYSIS
☐ MATERIAL HISTORY
☐ ENGINEERING ANALYSIS
☐ MANPOWER ANALYSIS
☒ SUPPLY SUPPORT ANALYSIS
☐ CONFIGURATION STATUS
☐ FINANCIAL PLANNING
☒ OTHER (EXPLAIN BELOW)

REMARKS: Effectiveness of Training

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

Figure 13-1.—Ships' 3-M Data Request Form.

decide that the gun needs to be rebarreled at an earlier date than may have already been planned.

You are reviewing magazine temperature records and discover that the forward magazine consistently has a 2° higher daily temperature reading than the after magazine. Is the forward magazine getting warmer than the after magazine? Is one of the magazine thermometers out of proper calibration? These are some of the factors that should be examined and acted upon.

As you can see, your system logs can provide valuable insight into any number of equipment deficiencies or tendencies. Always try to maintain accurate records and logs.

TECHNICAL LIBRARY

Whether you are on a small or large ship, some type of division technical library for technical pubs, reference pubs, training pubs, arid handbooks should exist. The tech library should also have at least one up-to-date copy of each applicable equipment and system technical manual.

As with other publications, you should have a master inventory of the tech library publications. The publication record and inventory card, OPNAV 5070/11 (fig. 13-2), will help the tech library petty officer keep track of publications (issued, on hand, and soon). When changes to publications arrive, you can consult the record cards for the location and quantity of publications requiring changes. Using this card, you can ensure that all publications held receive changes as they should.

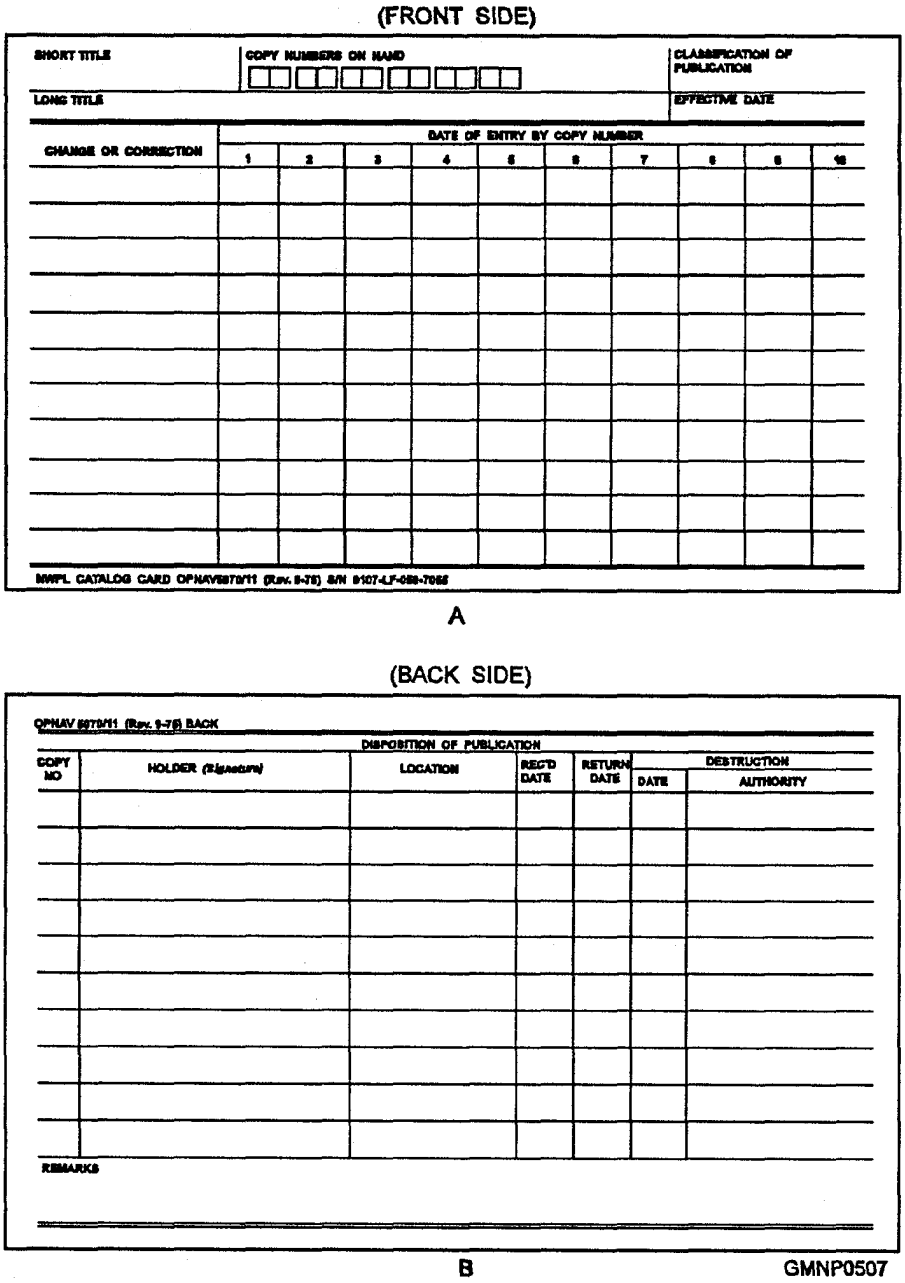


Figure 13-2.—Publication Record and Inventory Card (5x7), OPNAV 5070/11.]

As publications become unusable because of extensive wear and damage, order new publications (and changes) to replace them. Issue these replacements to work center personnel as necessary. To avoid confusion, ensure that the old publications are discarded or destroyed after the new replacement publications have been received. Be sure to follow applicable security requirements when discarding or destroying a publication.

Several methods can be used in maintaining a tech library. NWP-0 and Naval Air Systems Command Technical Manual Program (NAVAIR 00-25-100) contain guidelines for maintaining major technical libraries. Applicable sections of these manuals may provide guidance you can adapt to your local situation.

At least one petty officer should be assigned to maintain the ready reference library (technical library) of your division. A second person should be assigned as a backup so that your tech library will stay current if the assigned librarian is absent.

Another problem of maintaining publications is that of keeping them updated. Of real help to you will be the *Navy Stock List of Publications and Forms, NAVSUP* 2002, and the Ships Technical Publications System (STEPS) products.

NAVSUP 2002

NAVSUP 2002 is a master set of microfiche, issued quarterly, that lists most Navy publications and forms. Each edition supersedes and replaces the previous edition in its entirety. The NAVSUP 2002 contains three major sections:

- Forms
- Publications
- Naval technical directives

This microfiche set provides data, such as canceled, canceled-no superseding stock numbers, canceled-incorporated in basic stock number, "replace by" information, and effective dates.

SHIPS TECHNICAL PUBLICATIONS SYSTEM (STEPS)

The Ships Technical Publications System (STEPS) is also a master set of microfiche. Several STEPS data products are distributed that contain information concerning technical documentation supporting the following general documents:

- Ships selected records
- Ships electronics
- Hull, mechanical, and electrical (HM&E) and ordnance systems
- Equipment under the cognizance of Naval Sea Systems Command (NAVSEA)
- Equipment under the cognizance of Space and Naval Warfare Systems Command (SPAWAR)

PUBLICATION APPLICABILITY LIST (PAL)

The Publication Applicability List (PAL) is one of the products of STEPS. This microfiche set is intended to assist in determining the publication needs of the ship or shore station to which it applies. It is an important tool in identifying the technical manual that you need. The PAL applies to NAVSEA and NAVELEX (SPAWAR) technical manuals for systems and equipments reported to be installed on your ship. It is not a list of publications required for your ship but is a list of publications that apply to your ship. The PAL lists technical manuals two ways—by equipment name and by publication number. If you know one, you can get the other, as well as the publication title of the technical manual. The PAL is organized into four separate volumes, matching the categories of technical manuals aboard ship. These volumes/categories are as follows:

Vol. 1. *General Publications*

Vol. 2. *Electronics*

Vol. 3. *Hull, Mechanical, and Electrical*

Vol. 4. *Weapons*

Volume 1 is not equipment oriented and is in publication number sequence only. Volumes 2, 3, and 4 have two parts so that you can lookup technical manuals either by equipment name or by technical manual publication number.

TECHNICAL MANUAL MANAGEMENT PROGRAM (TMMP)

The *Guide for User Maintenance of NAVSEA Technical Manuals, S0005-AA-GYD-030/TMMP,* has been developed to assist technical manual users in interfacing with the NAVSEA Technical Manual Management Program (TMMP). It also provides specific information in the following areas:

- How to identify what technical manuals are needed
- How and from what activity to request technical manuals
- How technical manual deficiencies are reported
- How technical manual deficiency reports are processed
- How to update (through changes or new publication) technical manuals
- How to determine whether technical manuals are current
- What must be done upon receipt of technical manuals in hard copy or microfiche form

TECHNICAL MANUAL IDENTIFICATION NUMBERING SYSTEM (TMINS)

Another publication you will need for operating a technical library is the *Technical Manual Identification Numbering System (TMINS) Application Guide and Index,* M0000-00-IDX-000/TMINS. This publication serves as the sole reference handbook for all component commands involved with the composition, construction, interpretation, or assignment of technical manuals or

associated technical document identification numbers. This guide will help you understand how the TMINS numbers apply to the new publication numbering system.

COMBAT SYSTEMS READINESS

LEARNING OBJECTIVES: Discuss the importance of a Combat System Readiness Review (CSRR).

Before deployment, a ship undergoes several different evolutions in preparation for that deployment. One of the more important processes is the performance of a Combat Systems Readiness Review (CSRR) or a Combat Systems Readiness Test (CSRT). As directed by the appropriate type commander, a CSRR is conducted aboard surface ships in the Atlantic Fleet, while Pacific Fleet surface ships receive a CSRT. Basically, the two programs are the same with only minor technical and administrative differences. For the purpose of explanation, the COMNAVSURFLANT CSRR procedures will be described in this text.

Primarily, the CSRR is conducted to assist ship's force in achieving the maximum level of combat systems readiness and efficiency attainable immediately before deployment. Additionally, the CSRR should assist ship's force personnel in correcting material problems and provide on-the-job training to improve mission self-sufficiency. The systems and subsystems evaluated (tested) during CSRR are listed in table 13-1. A CSRR is conducted approximately 60 to 120 days before a ship's deployment, and depending upon the class of ship being tested, requires 5 to 10 working days to complete. A CSRR on a Naval Reserve Force ship is conducted approximately 30 to 60 days before Refresher 'Mining (REFTRA).

An important part of the CSRR is the software review portion of the test. "Software," for the purposes of the CSRR, is defined as test equipment, technical documentation, and supply documentation. The software review phase may include performance of the following:

- **GPETESAT.** A review of the ship's general- and special-purpose electronic test equipment, including calibration status.

Table 13-1.—Equipment Evaluated During CSRR

SYSTEMS
Surface Missile (and associated Fire Control Equipment)
Gun (and associated Fire Control Equipment)
Antisubmarine Warfare Batteries (and associated Fire Control Equipment)
Navy Tactical Data System
Electronic Warfare
Search Radar
Target Interrogator (IFF)
Communications
Navigation Aids
SUBSYSTEMS
Interior Communications
Dry Air
400 Hz Power
Radar Cooling
Antennas
Sonar Dome Pressurization

- **PUBSAT.** A comparison of the ship's publication inventory (including the latest changes and revisions) with the Publication Applicability List (PAL).
- **LOGSAT.** A review of the ship's COSAL, APLs/AELs, and selected repair parts.
- **A review** of configuration and field changes applicable to the equipment necessary to support performance of the required operability tests.

The software review is conducted by the appropriate NAVSEACEN before the functional equipment testing phase of the CSRR.

The operational testing portion of the CSRR is accomplished using current equipment PMS checks as well as any other existing equipment level tests that may be necessary.

At the conclusion of the CSRR, the type commander and any applicable addressees are notified of test results via the "Quick Look" message format. Additionally, all

parties concerned are provided with a CSRR Detailed Discrepancy Report (fig. 13-3) and a CSRR Summary Report (fig. 13-4).

It is important that you become actively involved in an assigned CSRR/CSRT. It is an excellent means of identifying fictional and procedural deficiencies that may exist within your equipment or work centers. Detailed guidelines for CSRR/CSRT procedures are contained in COMNAVSURFLANT(PAC) INST 9093.1.

CASUALTY REPORT (CASREP) SYSTEM

LEARNING OBJECTIVES: Discuss and demonstrate a working knowledge of the casualty report system.

As the LPO or LCPO, the number of systems and ancillary equipment you become involved with is going to increase. Because of such factors as lack of experienced personnel, lack of repair parts, or a need of technical assistance, equipment may remain inoperative or damaged for extended periods of time. To alleviate these situations, the Navy has developed a system of repining and monitoring equipment casualties.

The casualty report (CASREP) system has been designed to support the Chief of Naval Operations and fleet commanders in the management of assigned forces. The effective use and support of Navy forces require an up-to-date, accurate operational status for each unit. An important part of operational status is casualty information. With this system, Navy managers are kept aware of when we need such things as repair parts or assistance to maintain maximum equipment efficiency. When casualties are reported, operational commanders and support personnel are alerted to the status of significant equipment malfunctions that may result in the degradation of a unit's readiness. The CASREP also reports the unit's need for technical assistance and/or replacement parts to correct the casualty. Once a CASREP is submitted, CNO, fleet commanders in chief (FLTCINCs), and the Ships Parts Control Center (SPCC) receive a hard copy of the message. Additionally, the CASREP message is automatically entered into the Navy Status of Forces

COMBAT SYSTEMS READINESS REVIEW
DETAILED DISCREPANCY REPORT

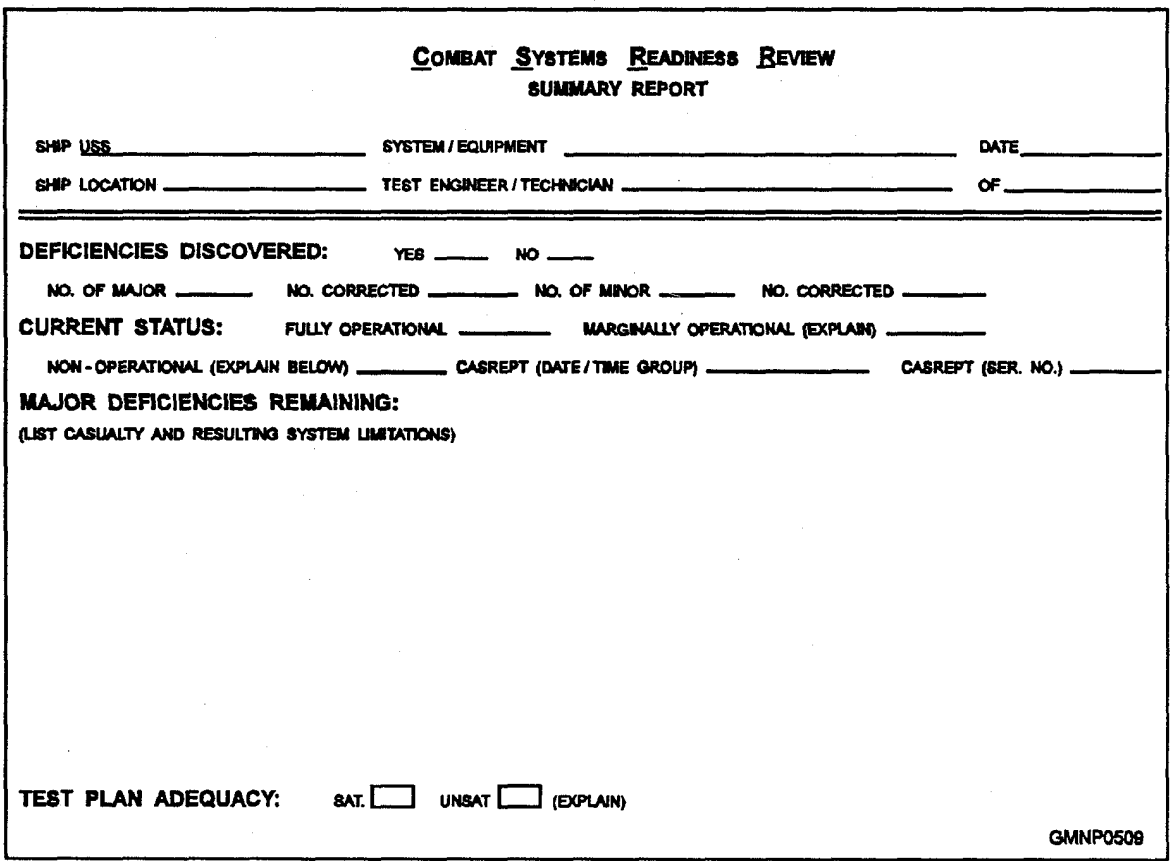
USS _____

EQUIPMENT/SYSTEM			MK/MOD	SERIAL NO.	TEST ENGINEER/TECHNICIAN AND COMMAND OR COMPANY		DATE		
TEST	(CHECK ONE) SAT	UNSAT	DEFICIENCY ENCOUNTERED		CORRECTIVE ACTION RECOMMENDED/TAKEN	BY	(CHECK ONE) MINOR	MAJOR	

PAGE____OF_____PAGES

GMNP0508

Figure 13-3.—CSRR Detailed Discrepancy Report.



COMBAT SYSTEMS READINESS REVIEW
SUMMARY REPORT

SHIP USS _____ SYSTEM / EQUIPMENT _____ DATE _____

SHIP LOCATION _____ TEST ENGINEER / TECHNICIAN _____ OF _____

DEFICIENCIES DISCOVERED: YES ____ NO ____

NO. OF MAJOR _____ NO. CORRECTED _____ NO. OF MINOR _____ NO. CORRECTED _____

CURRENT STATUS: FULLY OPERATIONAL _____ MARGINALLY OPERATIONAL (EXPLAIN) _____

NON-OPERATIONAL (EXPLAIN BELOW) _____ CASREPT (DATE / TIME GROUP) _____ CASREPT (SER. NO.) _____

MAJOR DEFICIENCIES REMAINING:
(LIST CASUALTY AND RESULTING SYSTEM LIMITATIONS)

TEST PLAN ADEQUACY: SAT. ☐ UNSAT ☐ (EXPLAIN)

GMNP0509

Figure 13-4.—CSRR Summary Report.

data base at each FLTCINC site, and follow-up messages are forwarded to the CNO database.

As CASREPs are submitted, managers are able to monitor the current status of each outstanding casualty. Through the use of high-speed computers, managers are able to collect data concerning the history of malfunctions and effects on readiness. This data is essential to the maintenance and support of units dispersed throughout the world.

Unit commanders should be aware that alerting seniors to their unit's operational limitations, brought about by equipment casualties, is important in expediting receipt of replacement parts and in obtaining technical assistance. Both of these functions of CASREP are necessary to provide the information needed in the realm of command and control of U.S. Navy Forces and to maintain the units in a truly combat ready status. Unit commanders should not delay or withhold reports to maintain the unit's readiness rating artificially at a higher than actual level. Support from every level, including intermediate and unit commanders, is essential to maintaining the highest level of combat readiness throughout the Navy.

A "casualty" is defined as an equipment malfunction or deficiency that cannot be connected within 48 hours and falls into one or more of the following categories:

1. Reduce the unit's ability to perform a primary mission.

2. Reduce the unit's ability to perform a secondary mission (casualties affecting secondary mission areas are limited to Casualty Category 2).

3. Reduce a training command's ability to provide a major segment of its program and cannot be corrected relatively quickly by local action alone.

TYPES OF CASREPS

The CASREP system contains four different types of reports: **INITIAL, UPDATE, CORRECT,** and **CANCEL.** These reports of equipment casualties are submitted using a combination of two or more messages, depending on the situation and contributing factors. These four types of reports are described in the following paragraphs,

P 151744ZAPR82

FM USS KITTY HAWK

TO COMSECONDFLT
CTG TWO ZERO PT TWO
COMNAVAIRLANT NORFOLK VA
NAVSSES PHILADELPHIA PA

INFO AIG SIX EIGHT FOUR THREE
NAVSEADET NORFOLK VA
NUSC NEWPORT RI
COMNAVELEXSYSCOM WASHINGTON DC
NAVSHIPWPNSYSENGSTA PORT HUENEME CA

BT

C O N F I D E N T I A L

MSGID/CASREP/CV 63 KITTY HAWK/27//

POSIT/4530N2-04645W9/15615ZAPR82//

CASUALTY/INITIAL-82012/NO 1 OXYGEN ANAL/EIC:F300/CAT:2//

ESTIMATE/302359ZMAY82/RECEIPT OF PARTS NLT 28MAY82//

ASSIST/OTHER/PHILADELPHIA//

AMPN/REQUEST ASSISTANCE FROM NAVSSES PHILA//

PARTSID/APL:490002/-/JCN:N03363-EB01-0802//

TECHPUB/NAVSEA 0956-LP-023-0810//

1PARTS

/DL	NATIONAL STOCK NO.	ROD	COSAL	ONBD	CIRCUIT
/01	9H5930-01-050-6624	001	000	000	-
/02	9H6630-01-049-0947	001	000	000	-//

AMPX/REASON ITEM NOT ON BOARD-NO ALLOWANCE ALL PARTS LISTED IN PARTSID APL//

1STRIP

/DL	DOCUMENT ID	QTY	PRI	RDD	ACTIVITY	REQUISITION STATUS
/01	V03363-0094-W400	001	05	149	NNZ	131601ZAPR82
/02	V03363-0094-W401	001	05	149	NNZ	131601ZAPR82

RMKS/ANALYZER FAILS TO GIVE ACCURATE CONTINUOUS READOUTS.

CAUSING COMPLETE LOSS OF OXYGEN MONITORING CAPABILITY. CAUSES DELIEVED TO BE COMBINED ENVIRONMENT {HEAT AND HUMIDITY OF FIREROOMS} AND PARTS FAILURE. OXYGEN MONITORS HAVE NOT WORKED PROPERLY SINCE INSTALLATION DURING ROH 80. NAVSSES PROVIDED TECH ASSISTANCE IN JULY 1980. SHIP'S FORCE INSPECTION HAS NOW REVEALED HOLES IN BOTH TEFLON MEMBRANCES.

SHIPS SCHEDULE: INPORT PHILADELPHIA 14 MAY-12 JUN. CONSIDER 28-30 MAY IDEAL TIME TO OBSERVE UNITS IN OPERATION DUE TO INTENDED LIGHTOFF 28 MAY AFTER IMAV.//

DWNGRADE/DECL 30NOV82//

BT

{CLASSIFIED FOR ILLUSTRATIVE PURPOSES ONLY}

Figure 13-5.—Example of an INITIAL CASREP message.

The INITIAL CASREP

The **INITIAL CASREP** (fig. 13-5) identifies, to an appropriate level of detail, the status of the casualty, repair parts (if any are required), and whatever assistance may be necessary. This information is essential to allow operational and staff authorities to apply the proper priority to necessary resources. Each Initial CASREP should contain a **CASUALTY** set, followed by one or more sets that convey information concerning that casualty. Further explanation of the message sets is provided later in this chapter. An Initial CASREP should be submitted using the following criteria:

1. An Initial CASREP may be submitted if a unit is in need of outside assistance only; that is, no parts are required to correct an equipment casualty.

2. When a casualty results from inadequate general-purpose electronic test equipment (GPETE) or preventive maintenance (PMS). The affected system should be the subject of the Initial CASREP with GPETE or PMS reported as the cause in an **AMPN** set.

3. An **ASSIST** set should be used to report whether or not a unit requires outside assistance to repair an equipment casualty.

4. When a unit requires assistance and/or parts to repair a casualty, scheduling information should be reported in the **RMKS** set for a full 30-day period, commencing on the earliest date that the unit can receive the assistance and/or parts. In addition to the scheduling information, the unit commander may also report any effect the casualty is expected to have on the unit's employment during the 30-day period.

5. An Initial CASREP is used to report the occurrence of a significant equipment casualty and provides specific information concerning repair of the casualty.

6. Only one initial casualty should be submitted in the Initial CASREP; best estimates for unavailable data should be included in the Initial CASREP and corrected as soon as possible in an Update CASREP.

The UPDATE CASREP

An **UPDATE CASREP** (fig. 13-6) is used to report information similar to that in the Initial CASREP. With

```
P 201234ZAPR82
FM          USS SARATOGA
TO          COMSECONDFLT
            CTG TWO ONE PT ONE
            COMNAVAIRLANT NORFOLK VA
INFO        AIG SIX EIGHT FOUR THREE
            NAVSEC NORFOLK VA
            NUSC NEWPORT RI
            COMNAVELEXSYSCOM WASHINGTON DC
            NAVSHIPWPNSYSENGSTA PORT HUENEME CA
BT
C O N F I D E N T I A L
MSGID/CASREP/CV 60 SARATOGA/69//
POSIT/MAYPORT/201130ZAPR82//
REF/CASREP/SARATOGA/191130ZAPR82//
CASUALTY/UPDATE-03-82061/AN-SPN-43A RADAR SET/EIC:PD04/CAT:4//
ESTIMATE/212200ZAPR82//
AMPN/ALL PARTS RECEIVE 201000ZAPR82 REPAIRS IN PROGRESS//
REF/CASREP/SARATOGA/191330ZAPR82//
CASUALTY/UPDATE-01-82062/AN-URC-35 RADIO SET/EIC:QDB5/CAT:3//
ESTIMATE/261200ZAPR82//
REF/CASREP/SARATOGA/201800ZAPR82//
CASUALTY/UPDATE-01-82065/AN-SPA-25 RADAR REPEATER/EIC:P704/CAT:3//
DWNGRADE/DECL 20OCT82//
BT
                    {CLASSIFIED FOR ILLUSTRATIVE PURPOSES ONLY}
```

Figure 13-6.—Example of an UPDATE CASREP message.

the exception of the **CASUALTY** and **ESTIMATE** sets, only previously unreported casualty information or information that has changed (or was reported in error) need be reported. Information in a previously reported data set may be changed by merely submitting the same data set again with the corrected information except for the **ASSIST, 1PARTS,** and **1STRIP** sets. An Update CASREP should be submitted using the following criteria

1. There is a need to complete any information reporting requirements or to revise previously submitted information.

2. The casualty situation changes; that is, the estimated repair date has changed, parts status has

P 141735Z MAY 82
FM USS KITTY HAWK
TO COMSECONDFLT
CTG TWO ZERO PT TWO
COMNAVAIRLANT NORFOLK VA
NAVSSES PHILADELPHIA PA
INFO AIG SIX EIGHT FOUR THREE
NAVSEC NORFOLK VA
COMNAVELEXSYSCOM WASHINGTON DC
NAVSHIPWPNSYSENGSTA PORT HUENEME CA
BT
C O N F I D E N T I A L
MSGID/CASREP/CV 63 KITTY HAWK/28//
POSIT/PHILADELPHIA/141715ZMAY82//
REF/CASREP/KITTY HAWK/151744ZAPR82//
CASUALTY/UPDATE–01–82012/NO 1 OXYGEN ANAL/EIC:F300/CAT:2//
ESTIMATE/302359ZMAY82/RECEIPT OF PARTS NLT 28MAY82//
AMPN/PARTS ORDERED PREVIOUSLY HAVE BEEN RECEIVED. REPAIRS CANNOT BE COMPLETED UNTIL ADDITIONAL PARTS ARE RECEIVED//
CHANGE/1PARTS

/DL	NATIONAL STOCK NO.	ROD	COSAL	ONBD	CIRCUIT
/03	UNKNOWN	002	000	000	–
/04	UNKNOWN	00L	000	000	–//

AMPN/DL03–DL04 REASON ITEMS NOT ON BOARD–NO ALLOWANCE. PARTS NUMBERS PROVIDED BY NAVSSES PHILA. DL03 PART NO. 098–022, DL04 PART NO. 098–008 APL DL03 49001 DL04 49002//
CHANGE/1STRIP

/DL	DOCUMENT ID	QTY	PRI	RDD	ACTIVITY	REQUISITION STATUS
/03	V03363–0094–W402	002	05	149	NNZ	131403ZMAY82
/04	V03363–0094–W403	001	05	149	NNZ	13L404ZMAY82

RMKS/NAVSSES TECH REP IDENTIFIED ADDITIONAL PARTS REQUIRED. NL CHANGE IN REPAIR SCHEDULE AT THIS TIME.//
DWNGRADE/DECL 14DEC82//
BT
{CLASSIFIED FOR ILLUSTRATIVE PURPOSES ONLY}

Figure 13-7.—Example of a multiple UPDATE CASREP message.

changed significantly, additional assistance is required, and so forth.

3. Additional malfunctions are discovered in the same equipment.

4. All parts ordered to repair the equipment have been received.

5. Upon receipt of any significant part or equipment, inclusion of the date of receipt is required in the message.

There should only be one outstanding CASREP for each item of equipment. Additional problems or malfunctions on the same item should be reported using an Update CASREP and do not require the submission of a new Initial CASREP.

Each casualty being updated in an Update CASREP should begin with a **CASUALTY** set, followed by one or more sets that convey information concerning that casualty. An **AMPN** set should be used (immediately following the **ESTIMATE** set) to report the receipt of parts previously reported as being required to repair a casualty.

Figure 13-7 shows an example of a multiple Update CASREP message. This type of update maybe used when a number of outstanding CASREPs remain uncorrected for various reasons.

The CORRECT CASREP

A **CORRECT CASREP** (fig. 13-8) is submitted when equipment that has been the subject of a casualty report is repaired and back in operational condition. CASREPs that report the correction of a casualty situation should include the following information in an **AMPN** set:

1. The delay, expressed in hours, in correcting the casualty because of parts unavailability caused by the supply system

2. A final parts status, including a list of all parts requested and the dates they were received

3. The number of man-hours expended in correcting the casualty

P 010914ZJUN82
FM USS KITTY HAWK
TO COMSECONDFLT
CTG TWO ZERO PT TWO
COMNAVAIRLANT NORFOLK VA
INFO AIG SIX EIGHT FOUR THREE
NUSC NEWPORT RI
COMNAVELEXSYSCOM WASHINGTON DC
NAVSHIPWPNSYSENGSTA PORT HUENEME CA
BT
C O N F I D E N T I A L
MSGID/CASREP/CV 63 KITTY HAWK/29//
POSIT/PHILADELPHIA/010800ZJUN82//
REF/CASUALTY/KITTY HAWK/151744ZAPR82//
CASUALTY/CORRECT–82012/NO 1 OXYGEN ANAL/EIC:F300/CAT:2//
AMPN/TEN HOUR DELAY IN RECEIPT OF PARTS. 138 MANHOURS EXPENDED TO CORRECT.
PARTS RECEIVED
LIST: DL01 132044ZMAY82 DL02 132044ZMAY82
DL03 142230ZMAY82 DL04 142230ZMAY82//
DWNGRADE/DECL 01DEC82//
BT
{CLASSIFIED FOR ILLUSTRATIVE PURPOSES ONLY}

Figure 13-8.—Example of a CORRECT CASREP message.

The CANCEL CASREP

A **CANCEL CASREP** (fig. 13-9) is submitted when equipment that has been the subject of casualty reporting is scheduled to be repaired during an overhaul period or other scheduled availability. Outstanding casualties that are not to be repaired during such availability should not be canceled and remain subject to normal follow-up procedures. The reason for cancellation (i.e., the scheduled availability, including location and date during which a casualty is expected to be repaired) should be identified in an **AMPN** set immediately following the **CASUALTY** set.

As you can see by the example CASREP messages, the addressees listed are commands and activities that are concerned with your unit's casualty. They may be the commands or activities that will expedite any assistance or support required. These addressees will vary with major geographical locations (Pacific, Atlantic, Mediterranean, etc.). The senior operational commander, immediate operational commander, and cognizant type commander should be the action addressees on all CASREPs. The appropriate aviation type commander should be included as an information addressee on all CASREPs from naval air stations and facilities. Certain other addressees are required to be included as information addressees when the CASREP deals with specific equipment types. These addressees are identified in NWP 10-1-10.

You should use the appropriate AIG (address indicating group) for information addresses. Other special action addressees and information addressees dictated by fleet commanders, type, or other operational commanders will be included. The communications and operations officers of your unit can provide you with the required addressees you will need when submitting a CASREP.

CASUALTY CATEGORIES

A casualty category is associated with each reported equipment casualty. Categories 2,3, and 4 (category 1 is not used) reflect the operational urgency or priority of the casualty. The casualty category, although not a readiness rating, is directly related to the unit's equipment readiness (this information is explained in OPNAVINST C3501.66, UNITREP) in those primary and/or secondary missions that are affected by the casualty.

The casualty category (2, 3, or 4) is based upon the specific casualty situation being reported and may not necessarily agree with the unit's overall readiness status. The casualty category is reported in the **CASUALTY** set and is required in all CASREPs.

R 281923ZSEP82
FM USS KITTY HAWK
TO COMTHIRDFLT
COMNAVAIRPAC SAN DIEGO CA
INFO AIG SIX EIGHT FOUR TWO
COMNAVSEACENPAC SAN DIEGO CA
NAVSEC PHILADELPHIA PA
BT
C O N F I D E N T I A L
MSGID/CASREP/CV 63 KITTY HAWK/34//
POSIT/SAN DIEGO/281815ZSEP82//
REF/CASREP/KITTY HAWK/201923ZSEP82//
CASUALTY/CANCEL–82022/NO 18 MAIN FEED PUMP/EIC:P162/CAT:2//
AMPN/REPAIRS TO BE COMPLETED BY SHIPYARD WORKERS DURING RESTRICTED AVAILABILITY SCHEDULED FROM 15OCT82 TO 10JAN83//
DWNGRADE/DECL 28MAR83//
BT
{CLASSIFIED FOR ILLUSTRATIVE PURPOSES ONLY}

Figure 13-9.—Example of a CANCEL CASREP message.

The selected casualty category should never be worse than a mission area M-rating reported through UNITREP for the primary missions affected by the casualty. Table 13-2 shows the criteria for determining the casualty category.

CASREP MESSAGE FORMAT

A CASREP message consists of one or more data sets that convey suffiicient information, to satisfy the requirements of a particular casualty reporting situation. These data sets are preceded by a standard Navy message header consisting of precedence, addressees, and classification. Specific guidelines for both the message header and data sets to be used are contained in NWP-10-1-10, Operational Reports. This publication also provides detailed information for typing each kind of casualty report (INITIAL, UPDATE, CORRECT, or CANCEL) with examples of different CASREP situations and how to submit the applicable report for each.

A CASREP message will always be serialized. This serialization will be the **MSGID** (message identification) set, which appears immediately after the message classification line. The serial numbers are sequential from 1 through 999 for every CASREP originated by a unit. These serial numbers should never be repeated until a new sequence of 1 through 999 has begun. Anew sequence of numbers starts after the unit has submitted CASREP message number 999.

The date-time-group (DTG) of the message transmission is the effective time ("as of" time) of the CASREP. Follow-up CASREP messages (UPDATE, CORRECT, or CANCEL) should reference the INITIAL CASREP message DTG.

Because of the importance and priority of CASREP message transmission, these messages should be transmitted even under communications MINIMIZE conditions. The standard naval telecommunications systems (NTS) service procedures are used in correcting any messages having transmission errors.

Refer again to the example messages shown in figures 13-5 through 13-9. Notice that many data sets (such as **MSGID, POSIT,** and **REF)** are used in the CASREP messages. The following is a list of authorized data sets as they are used in submitting CASREP messages:

DATA SET	BRIEF DESCRIPTION
AMPN	Provide amplifying information concerning the immediately preceding set.
ASSIST	Report the requirement for outside assistance.

Table 13-2.—Casualty Categories and Criteria

CASUALTY CATEGORY	EQUIPMENT CRITERIA
*2	a. A deficiency exists in mission essential equipment which causes a minor degradation in any primary mission, or a major degradation or total loss of a secondary mission.* b. The unit must have reported an Equipment Readiness Resource-Specific Rating of 2, 3, or 4 in primary missions affected by this casualty.
3	a. A deficiency exists in mission essential equipment which causes a major degradation but not the loss of a primary mission. b. The unit must have reported an Equipment Readiness Resource-Specific Rating of 3 or 4 for a primary mission affected by this casualty.
4	a. A deficiency exists in mission essential equipment that is worse than casualty category 3, and causes a loss of at least one primary mission. b. The unit must have reported an Equipment Readiness Resource-Specific Rating of 4 for a primary mission affected by this casualty.
*Casualties affecting a secondary mission will always have a Casualty Category of 2.	

CASUALTY Identify the type of casualty and the equipment suffering the casualty.

CHANGE Report changed information in columnar data sets (1PARTS and 1STRIP) only.

DELETE Remove selected CASREP data from the unit's record. **DELETE** may be used only with the **ASSIST, 1PARTS,** and **1STRIP** sets.

DWNGRADE Provide declassification and/or downgrading instructions for classified messages.

ESTIMATE Report the estimated time of casualty correction and factors that might affect the estimate.

MSGID Report identifying information for all Navy reporting structure (NRS) messages.

1PARTS Report parts required to repair an equipment casualty.

PARTSID Provide equipment identification information.

POSIT Report a unit's present location and effective date and time.

REF Identify the Initial CASREP date-time-group.

RMKS Provide amplifying information concerning all or a part of the message. Also, training commands report percentage of lost training and affected courses.

1STRIP Report equipment MILSTRIP information.

TECHPUB Identify the technical manual that pertains to a casualty item.

As you can see, a working knowledge of CASREP procedures is an important tool in the maintenance of your unit's material and operational readiness. A lot of care and effort should be made to ensure that CASREP messages are correctly submitted. You may be the one who has to draft and submit these reports, so it is essential that you become familiar with the CASREP system.

ORDNANCE MANAGEMENT AND ADMINISTRATION

LEARNING OBJECTIVES: Discuss the importance of ordnance management and administration procedures.

You know that there is more to ordnance accountability than maintaining the ammunition ledger. You may find yourself in charge of several different types of ordnance, both ashore and at sea. Because of budgetary restraints or material availability and security, the Navy has to maintain very strict accountability on all ordnance material.

CAIMS REPORTING

The Conventional Ammunition Integrated Management System (CAIMS) is the automated data processing management information system for conventional ammunition. CAIMS is composed of large files that contain the various elements of data required for the worldwide management of the Navy's expendable non-nuclear ordnance. The data in these files is processed into reports and other outputs that are required by various ammunition logistic managers on Navy staffs and commands throughout the world. CAIMS is the single point of reference within the U.S. Navy for the worldwide status and visibility of the Navy's expendable non-nuclear ordnance data regardless of inventory management or ownership responsibilities.

Conventional ammunition includes bullets, projectiles, rockets, grenades, torpedoes, bombs, guided missiles, propellants, primers, fuses, detonators, charges of conventional explosives, and chemical or other materials excluding nuclear material. All component parts thereof must also be considered conventional ammunition.

The ordnance material specifically included by CAIMS is listed by the ordnance management cognizance symbols shown in table 13-3.

Worldwide ammunition asset and expenditure recording is accomplished through CAIMS by the use of a computer located at SPCC, Mechanicsburg, Pennsylvania. The computer uses a series of remote terminals via a secure network to disseminate data rapidly. Expansion of this telecommunications network is constantly ongoing. CAIMS users have continuously updated worldwide ammunition asset information

Table 13-3.—Ordnance Management Cognizant Symbols and Materials

COGNIZANCE	MATERIAL	INVENTORY CONTROL RESPONSIBILITY	TECHNICAL RESPONSIBILITY
ØT	USMC-Owned Conventional Ammunition	USMC	USMC
2E	Conventional Air Ammunition	SPCC	NAVAIR
2T	Conventional Surface and Underwater Ammunition	SPCC	NAVSEA
4E	ALM (Air Launched Missile) Material	SPCC	NAVAIR
4T	Torpedoes, Torpedo Components, and ASROC (Antisubmarine Rockets)	SPCC	NAVSEA
6T	Underwater Mines and Components	NAVMINENGRFAC	NAVSEA
8E	Air Launched Guided Missiles and Components	NAVAIR	NAVAIR
8S	SUBROC (Submarine Rocket) Material	NAVSEA	NAVSEA
8T	Surface Launched Guided Missiles and Components	NAVSEA	NAVSEA
8U	Sonobuoys	SPCC	NAVAIR

available to them. If a ship anywhere in the world is ordered on a mission, CAIMS can be queried by remote terminal to determine the status of the ship's ammunition load out.

CAIMS data distribution is not limited to activities having a CAIMS terminal. Hard-cover listings, computer tapes, and microfiche reports are furnished to hundreds of activities having a need for this information.

Reporting into CAIMS is accomplished by two means: (1) TIR (Transaction Item Reporting) by AUTODIN (Automatic Digital Network) for CONUS activities according to SPCCINST P8010.12, *Policy, Procedures, Responsibilities for Supply Management of Conventional Ammunition*; and (2) message reporting for fleet activities according to CINCLANTFLTINST 8010.4/COMNAVLOGPACINST 8015.1. The validity of CAIMS data is directly related to the care and accuracy with which the various ships and activities report their data to SPCC.

SPCCINST P8010.12, as inferred by the title, provides policy, procedural, and responsibility guidelines for the supply management of conventional ordnance. While portions of this instruction apply primarily to CONUS shore activities, it also provides a considerable amount of information valuable to fleet users, such as ammunition definitions and codes, procedures for fleet retrograde of ammunition, requisitioning procedures, allowance list information, and procedures for manual stock recording for nonautomated activities.

Ammunition support received by the fleet is directly related to the Navy's ability to justify its ammunition budget requests. Since CAIMS data provides the basis for this justification, it should be noted that fleet support is related to the timeliness and accuracy of fleet transactions reported into the CAIMS. It should also be emphasized that the need for coordination and close cooperation between weapons and supply department personnel in ammunition management is a necessity if the CAIMS is to operate efficiently and correctly.

Activities report in the fleet format report on an "as occurring" basis via naval message. The data reported includes receipts, issues, combat expenditures, training expenditures, losses and gains by inventory, transfers out of the system, test and evaluation expenditures, and disposal. These activities also report

serial and lot data for maintenance of the Master Serial/Lot Item File (MSF). Document numbers are reported for receipts from major shore activities to maintain the "in transit" files.

Naval weapon stations, naval air stations, and other ordnance activities ashore report by TIR on a daily basis. These activities use the full range of TIR transactions.

Ammunition Transaction Reporting

The most important file maintenance function of the CAIMS is performed by the asset reporters. This function is accomplished through the submission of Ammunition Transaction Reports (ATRs). An ATR should be submitted for any action that affects the on-hand quantity of conventional ammunition (e.g., issues, receipts, expenditures, and inventory gains or losses). Any stock adjustment exceeding 1 percent of assets should be justified with an appropriate explanation.

To minimize the reporting burden of the fleet, you should submit ammunition transaction reports only to SPCC, which will serve as the central repository for this information. All requests for Navy ammunition data will be fulfilled by SPCC (based upon CNO approval). Information addressees on fleet ATRs will beheld to the minimum required for operational reasons, except that fleet commanders will be information addressees on all transaction reports,

Each reporting activity is responsible for the accuracy of CAIMS data for its particular unit. Inventory managers have a responsibility for ensuring the accuracy of CONUS assets listed in the CAIMS. Fleet logistic agents have a responsibility for ensuring the accuracy of listed fleet assets. All CAIMS users have an obligation to pursue apparent errors in the CAIMS database and ensure their correction whenever possible.

It is important to recognize that fleet support for ammunition is directly related to the timeliness and accuracy of fleet transaction reporting into the CAIMS. Accuracy in this reporting process cannot be overemphasized.

The CAIMS data base is updated daily. Insofar as possible, transaction reports must be submitted on an as-occurring basis within 24 hours of the transaction. A report should not be delayed several days to justify or correct discrepancies. Prompt reporting should be accomplished and followed by a corrected report, if required.

A simple checkbook procedure is used for fleet reporting in an effort to minimize errors. Each transaction begins by reporting the opening balance, which must agree with the last reported closing balance. If it does not, an error message is sent to the reporting activity. Reconciliations are accomplished by message on an exception basis. Reconciliation procedures provide that a reconciliation transaction report, to confirm on-hand balances, should be submitted by the ship or unit for items having no activity in a 6-month period. All asset balances in CAIMS should be reconciled at least every 6 months.

As described before, reports of ammunition transactions form the basis for the maintenance of the CAIMS data file, which, in turn, is the sole source of asset and expenditure information for ammunition logistics management. The high cost and limited availability of many munitions create a need at all levels of command for continuous, intensive, and careful management of ammunition. This can only be accomplished if the CAIMS data file is current and reliable. Therefore, it is extremely important for individual ATRs to be accurately prepared and forwarded in a timely manner. ATRs are normally forwarded by routine message—NOT by NAVGRAM or naval letter.

The ATR is prepared in a prescribed message format and transmitted electrically. The message report consists of 7 paragraphs, Paragraphs 1 through 5 identify the number of transactions being reported, the serial number of the report, the UIC of the reporting activity, the action class code (ACT) of the reporting activity, and the date of the transaction, respectively. Paragraph 6 provides specific information on the type of transaction, type of material, quantity of material involved in the transaction(s), on-hand assets of the material, and other data pertinent to the transaction. This section may contain one or more lines. Each line corresponds to a single transaction involving one type of material. All reportable transactions should be included in this paragraph whether or not the items are included in paragraph 7 of the report. Paragraph 7 is for remarks concerning weapon serial numbers and other explanatory data, as required. Figure 13-10 shows a typical ART, reporting the receipt of ammunition from a shore activity.

R 152332Z JUN 84
FROM: USS NIMITZ
TO: SPCC MECHANICSBURG PA
INFO: CINCLANTFLT NORFOLK VA
UNCLAS //N08010//
SUBJ: AMMO TRANS RPT CINCLANTFLT 8010-4
1. ITEMS TWO
2. SER EIGHT FOUR
3. UIC 03368/0
4. ACT CLASS DELTA
5. DATE 84166/5
6.

A	B	C	L	N
H542/1	220/4	200/2	420/6	V03368/3280/8634/4
J421/7	0/0	400/4	400/4	V03368/3280/8635/5

7. REMARKS: RCVD FM WPNSTA YORKTOWN.

Figure 13-10.—ATR showing receipt from a shore activity.

Again, detailed reporting procedures, report format, and requisitioning procedures are provided in CINCLANTFLTINST 8010.4 and COMNAVLOGPACINST 8015.1. Dependent upon which fleet you are operating with, these instructions are the primary directives used in submitting ATRs.

Serial/Lot Item Tracking

Serial/Lot Item Tracking (SLIT) is required for air- and surface-launch missiles and boosters. SLIT provides for the complete tracking of certain items from birth to death by their unique serial or lot number.

Fleet units must SLIT-report on-loads from or off-loads to CONUS shore activities. They must also report intership transfers, expenditures, and condition code changes of all-up-rounds (AURs) and their components. SLIT reporting is required of both the receiving and issuing ships when an intership transfer is involved. The receiving/issuing ship must address each other for information on ATR message submissions. This requirement enables each ship to verify the transfers, correct any discrepancies, and submit the appropriate modified ATRs to SPCC.

All items that require SLIT reporting are contained in publication TW010-AA-ORD-010/NAVAIR 11-1-116A.

CALIBRATION AND REPAIR OF TEST/MEASURING EQUIPMENT

LEARNING OBJECTIVES: Discuss the calibration and repair of test/measuring equipment.

In the typical weapon system work center, there are several different devices (tools, test sets, and gauges) that are used to measure some component or function to a required standard. If these measuring devices are not maintained within the designed operating parameters, it only follows that your equipment will not function within its designed specifications. Three types of test, measuring, and diagnostic equipment (TMDE) are used with which you will be concerned:

1. **Electronic Test Equipment (ETE).** Electronic test equipment is broken down into two categories:

a. **General-Purpose Electronic Test Equipment (GPETE).** General-purpose electronic test equipment has the capability, without modification, to generate, modify, or measure a range of parameters of electronic functions required to test two or more equipments or systems of basically different designs. An oscilloscope would be classified as GPETE.

b. **Special-Purpose Electronic Test Equipment (SPETE).** Special-purpose electronic test

equipment is specifically designed to generate, modify, or measure a range of parameters of electronic functions of a specific or peculiar nature required to test a single prime equipment or system. An example of a SPETE is the Mk 363 Missile Electrical System Test Set (MESTS) used with the ASROC launcher.

2. **Electrical Test Equipment.** Electrical test equipment is any device that is specifically designed and primarily used to measure the basic parameters of current, voltage, resistance, and frequency of electrical power distribution equipment or systems. An example of electrical test equipment is a multimeter.

3. **Mechanical Test Instrument (MTI).** A mechanical test instrument is any device that is used to test, inspect, or diagnose a range of parameters in the measurement areas of pressure, temperature, flow, linear, optical, torque, weight, mass, and vibration. Torque wrenches, flow control metering valves, pressure gauges, and thermometers are just a few of the devices that are classified as MTIs.

TEST/MEASURING EQUIPMENT CALIBRATION

The Navy Metrology and Calibration (METCAL) Program was instituted to help provide calibration facilities so that sophisticated equipment, precise standards, and laboratory conditions would be available. Various echelons of calibration activities were established to meet these calibration requirements. These echelons are integrated so that each level activity has traceable standards tied to the highest standards available for calibration. We will describe the following calibration echelons:

National Bureau of Standards (NBS)

Metrology Engineering Center (MEC)

Navy Standards Laboratory—Type I

Navy Standards Laboratory—Type II

Navy Calibration Laboratory (NCL)

Fleet Calibration Laboratory (FCL)

Field Calibration Activity (FCA)

National Bureau of Standards (NBS)

The National Bureau of Standards (NBS) is the chartered agency of the federal government having custody of the nation's basic physical standards (national standards). It provides the common reference for all measurements made within the scope of the Navy calibration program and certifies the Navy standards submitted by the Navy Type I Standards Laboratories according to an approved schedule.

Metrology Engineering Center (MEC)

The Metrology Engineering Center (MEC) is an engineering group responsible for the technical coordination of the Navy calibration program. It is under the management control and technical guidance of the Naval Sea Systems Command (NAVSEASYSCOM). The Metrology Engineering Center is located at the Naval Industrial Reserve Ordnance Plant, Pomona, California, and is under the military command of the Naval Plant Representative Office, Pomona, California.

Navy Standards Laboratory—Type I

The Type I laboratories maintain the highest standards within the Navy calibration program. They maintain and disseminate measurements of the highest accuracy within the program. They obtain calibration services from NBS and provide calibration of laboratory standards and associated measuring equipment received from Type II standards laboratories and calibration laboratories.

Navy Standards Laboratory—Type II

The Type II laboratories furnish the second highest calibration services to assigned geographic areas within the naval establishment. They obtain standard calibration services from the cognizant Type I Navy Standards Laboratory and calibrate laboratory standards and associated measurement equipment received from lower echelon laboratories.

Navy Calibration Laboratory (NCL)

NCLs are located in shipyards, ship repair facilities, and at various NAVELEX field activities. An NCL is usually made up of a Reference Standards Laboratory (RSL) and one or more Local Standards Laboratories (LSLs). The RSL is a Type II laboratory. The LSL normally receives calibration from the RSL.

Field Calibration Laboratory (FCL)

The FCLs are established aboard tenders and repair ships and at selected shore activities. They provide calibration for fleet-held and selected shore-based activities' test equipment. The equipment submitted for calibration by ships will be funded by the shore activity or its sponsor.

Field Calibration Activity (FCA)

The Field Calibration Activity (FCA) segment of the Navy calibration program was established to extend

calibration-support capability to selected ships and shore activities to ensure the accuracy and reliability y of electronic test and measuring equipment. It also permits users to calibrate certain items of their own low-accuracy, high-volume electronic test equipment.

A complete FCA consists of suitable working spaces, field calibration packages, trained personnel, and the necessary support documentation, such as the *Metrology Requirements List (METRL)* and instrument calibration procedures (ICPs). The ICPs are provided as maintenance requirement cards and as NAVAIR 17-20 VQ series procedures.

METROLOGY AUTOMATED SYSTEM FOR UNIFORM RECALL AND REPORTING (MEASURE)

The preceding section explained the calibration echelons established for calibration of test equipment. Now let's take a look at an important calibration program called the Metrology Automated System for Uniform Recall and Reporting (MEASURE) Program.

The MEASURE Program is an automated data processing system designed to provide a standardized system for the recall and scheduling of test equipment into calibration facilities. It was developed to support the Department of the Navy's Metrology and Calibration (METCAL) Program in an effort to ensure that all equipment requiring calibration and servicing is submitted to a calibration activity on a timely basis and thus is maintained to a maximum level of efficiency and dependability. In addition, the system provides documentation of actions performed by the calibration activity.

The initial cycle of MEASURE begins with the completion of the inventory forms for equipment held by an activity (fig. 13-11). These forms are forwarded to the cognizant MEASURE data processing facility (DPF) to establish the data base. The activity holding the test equipment is then provided a printed inventory and a set of preprinted Metrology Equipment Recall and Report (METER) cards (fig. 13-12). The MEASURE cycle is completed when the cognizant METCAL representative provides recall schedules to the activity holding the test equipment and to the concerned calibration activities. As equipment is gained or lost, more inventory forms and METER cards are processed or deleted, the database is kept current, and the system continues to cycle,

Through the submission of METER cards, each activity must promptly update its recorded inventory; that is, the inventory data maintained in the computer data base by the MEASURE Operational Control Center (MOCC) and the Control Data Base Facility (CDBF), Concord, California. In this manner, calibration requirements can be projected in enough time to permit their incorporation into the next recall schedule. If the inventory is not updated promptly, new activity items will have to be rescheduled or be submitted to a calibration activity for unscheduled calibration upon prior approval of the cognizant METCAL authority.

The MEASURE Program provides management personnel with a wide variety of valuable information on fleet readiness, budget and funding information, and calibration problems.

MEASURE products and formats have been designed to meet the information requirements of several levels of management. Many MEASURE formats are forwarded automatically by the MOCC or CDBF to the activities on a regular basis. Such distribution is based upon the type and level of those activities and upon established requirements. Others, however, are available only upon the receipt of an approved request from the cognizant METCAL authority. Accordingly, activities needing a particular format that is not being received automatically should forward the requirement to the cognizant METCAL authority for approval. Any such request should include a justification of the need for the format and a statement indicating the frequency at which the format is required.

Just as the 3-M Systems generate automated data and reports, so also does the MEASURE Program. The. following MEASURE products are distributed automatically to activities by the MOCC and/or CDBF at the intervals shown below:

Format 215	Unmatched Listing	As required
Format 310	Test Equipment Inventory	Monthly
Format 350	Test Equipment Inventory in Subcustodian Order	Monthly
Format 802	Recall Schedule and "On-Site" Equipment	Monthly
Format 802	Recall Schedule and "Equipment due in Laboratory"	Monthly
	Replenishment preprinted METER cards	As required
	Blank METER cards	Initial issue

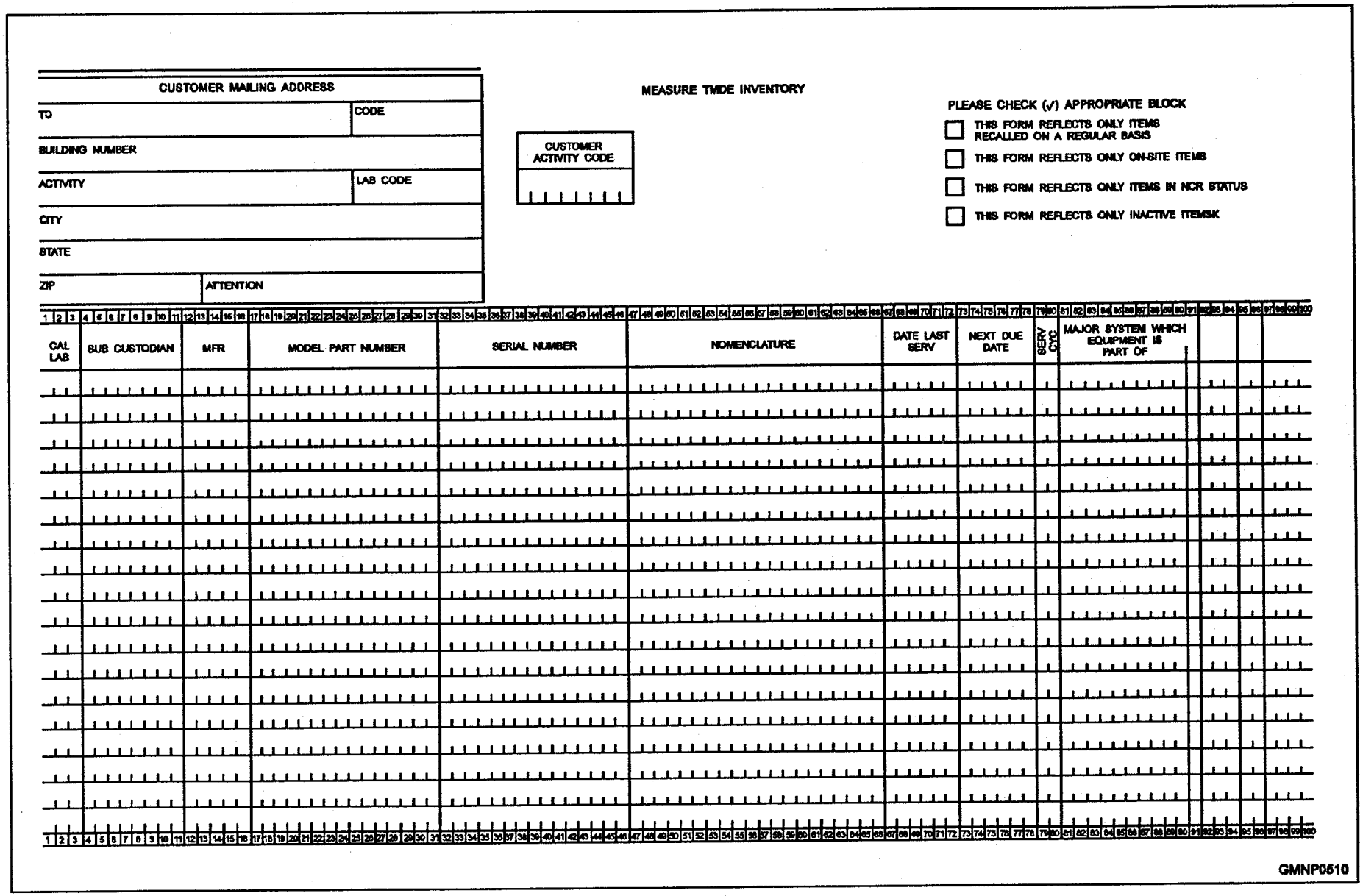
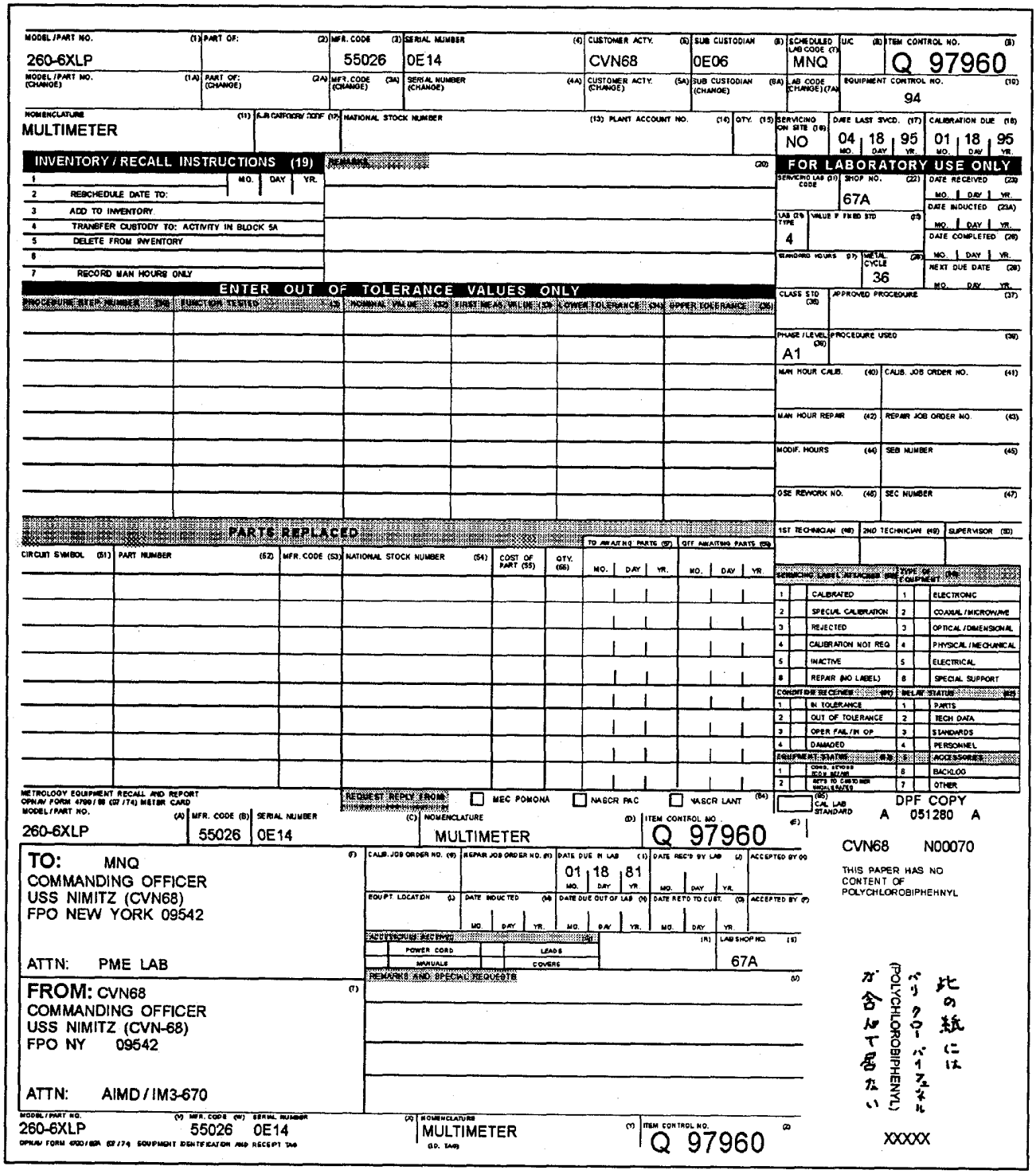


Figure 13-11.—MEASURE TMDE Inventory Report Form.



33NP0001

Figure 13-12.—OPNAV Form 4790/58, MEASURE METER Card.

For detailed information on the "MEASURE program (including the above listed formats), refer to the *Metrology Automated System for Uniform Recall and Reporting (MEASURE) User's Manual,* OPNAV 43P6A, commonly called the MEASURE User's Manual.

Equipment Calibration Status

The Navy calibration program has a series of distinctive labels and tags for indicating the calibration or serviceability status of all Navy test and measuring equipment. All calibration personnel and equipment users should be familiar with each label and tag and its meaning. Labels of different nomenclature, color combinations, and shapes have been designed to help users identify the calibration status. These labels and tags should be used by all participants in the Navy METCAL Program and should be affixed to all Navy standards and test/measuring equipment. NAVAIR 17-35MTL-1/NAVELEX 0969-LP-133-2101/ NAVSEA OD 45845, *Metrology Requirements List (METRL),* lists Navy calibration procedures and intervals for all laboratory standards and test/measuring equipment. Only equipment actually used for quantitative measurements requires calibration. The *Department of the Navy Metrology and Calibration (METCAL) Program* (NAVELEX Instruction 4355.2) permits the custodians of test and measuring equipment to obtain and affix **CALIBRATION NOT REQUIRED** and **INACTIVE** labels to test/measuring equipment. The METRL also identifies test and measuring equipments that are known to require calibration. Assistance in identifying other test/measuring equipment in this category is available from the respective METCAL group, from the systems commands' designated representatives, or from the Metrology Engineering Center (MEC). Examples of all labels and tags used m the METCAL Program are described and illustrated in the following paragraphs.

CALIBRATED.— The CALIBRATED label (fig. 13-13, black lettering with a white background) comes in two different sizes and is the most commonly used

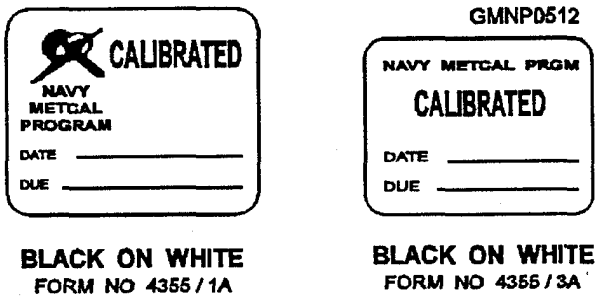


Figure 13-13.—CALIBRATED labels.

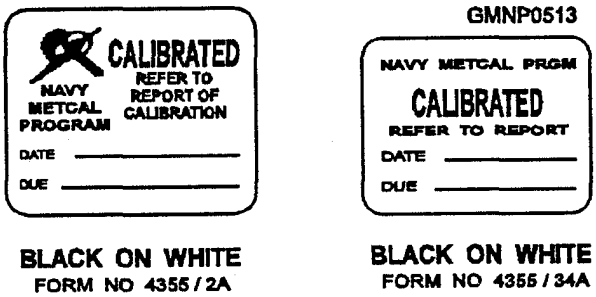


Figure 13-14.—CALIBRATED-REFER TO REPORT labels.

label in the Navy METCAL Program. It indicates that the instrument to which it is affixed is within its applicable tolerance on all parameters. If there are any qualifying conditions for use of the instrument, one of the other labels should be used.

CALIBRATED-REFER TO REPORT.— The CALIBRATED-REFER TO REPORT label (fig. 13-14, red lettering with a white background) also comes in two sizes. It is used when you must know actual measurement values and associated uncertainties to use the instrument.

SPECIAL CALIBRATION.— There are two SPECIAL CALIBRATION labels (fig. 13-15, black lettering with a yellow background), differing in size and content. There is also a SPECIAL CALIBRATION tag, which is used with the smaller of the two labels. The SPECIAL CALIBRATION label is to be used whenever there is some unusual or special condition in the calibration that should be drawn to the attention of the user and/or calibrating activity. Examples of special conditions are deviations from usual calibration tolerances, multiple calibration intervals, or a requirement for in-place calibration. The special condition that resulted in the special calibration should

Figure 13-15.—SPECIAL CALIBRATION labels and tag.

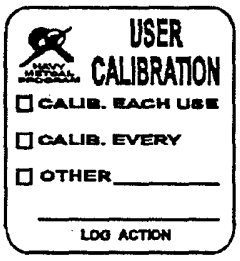
be described directly on the large label where sufficient space is available to mount the label on the instrument. When there is only enough spats for the small label on the instrument, this condition should be described on the tag. The following paragraphs briefly describe the situations that may require the use of the SPECIAL CALIBRATION label.

Deviation from Specifications.— In cases where the user does not require full-instrument capability, the calibration could be performed to reduce tolerances or cover less than all ranges and parameters. This approach is often used when the instrument does not meet Ml-calibration tolerances on certain ranges or parameters but can still meet user requirements. On the other hand, the special calibration may be for higher accuracy than usual on a short-term basis upon the specific request of the user. In many cases, users should be requesting special calibration because of deviation from specifications. For example, the user sends an instrument in for full calibration but will **never** use it over its full range. The user should have requested special calibration of the instrument to cover only the ranges needed. If this is accomplished Navywide, thousands of calibration hours and dollars could be saved.

Multiple Calibration Intervals.— Some instruments have components that require calibration less frequently than the rest of the instrument. For example, the attenuator in a signal generator may require calibration every 12 months, whereas the rest of the instrument parameters should be calibrated every 4 months. Since the attenuator calibration is time-consuming and may require unavailable standards, use of the multiple-interval approach can save many man-hours and can permit the more frequent calibration to be performed at a lower level laboratory. When a specific instrument has been designated for multiple calibration intervals, such information is provided in the applicable calibration procedure. The SPECIAL CALIBRATION label or tag should be annotated as Multiple Interval, and the type of calibration performed should be indicated (i.e., partial 1 of 2, 2 of 2, or complete calibration). The calibration due date reflects the due date of the next partial or complete calibration, as the case may be.

Calibrated in Place.— Some instruments should be calibrated in place. Annotation on the SPECIAL CALIBRATION label or tag and MEASURE format should alert both the user and the calibration activity that the instrument should not be removed but should be calibrated where it is actually installed.

GMNP0515



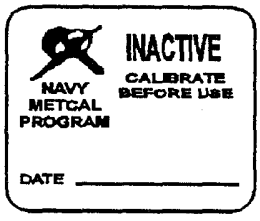
BLACK ON WHITE
FORM NO 4355/24

Figure 13-16.—USER CALIBRATION label.

USER CALIBRATION.— The user should calibrate some test/measuring equipments instead of referring the instruments to a calibration facility. For example, some instruments, such as hardness testers and densitometers, are provided with their own standards and should be calibrated each time they are used or at least on a frequent basis. Instruments, such as oscillographic recorders, may require calibration before, during, and after each use. Some automatic instruments have self-calibration tests that should be performed each time they are used. Still other instruments may require calibration as part of check-out procedures performed daily or weekly. These calibrations should be recorded in maintenance logs. Whenever recognized, the requirement for calibration by the user and the calibration interval are indicated in the METRL. The USER CALIBRATION label (fig. 13-16, black lettering with a white background) is affixed when the calibration is performed by the user. This label is not replaced at each calibration. When the label is first affixed to the instrument, it is annotated as to the appropriate calibration intervals. Records of calibrations performed (when calibration is performed other than each time the instrument is used) should be by normal maintenance practices, such as maintenance logs and maintenance action forms.

INACTIVE.— If an individual instrument due for recalibration will not be used for sometime in the future, the user may indefinitely postpone the recalibration by affixing an INACTIVE label (fig. 13-17, green lettering

GMNP0516



GREEN ON WHITE
FORM NO 4355/11A

Figure 13-17.—INACTIVE label.

with a white background) to the instrument. The INACTIVE label remains on the instrument until it is recalibrated. The instrument should not be used while it is bearing an INACTIVE label. The inactivation of test equipment occurs most commonly when a ship is in an overhaul status and the test equipment has been removed from the ship and stored in an environmentally safe location.

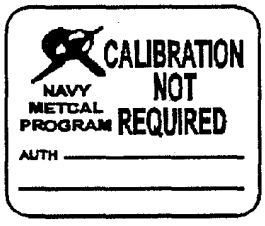
CALIBRATION NOT REQUIRED.— Standards and test/measuring instruments not requiring calibration are shown as NCR in the *Metrology Requirements List (METRL).* The CALIBRATION NOT REQUIRED label (fig. 13-18, orange letters with a white background) is affixed on the instrument and should remain there indefinitely unless its calibration requirements are changed. If an instrument is not listed in the METRL, you should use the following criteria (as listed in the METRL) to decide if the instrument should be placed in the CALIBRATION NOT REQUIRED CATEGORY:

- The instrument does not make quantitative measurements nor does it provide quantified outputs.
- The instrument is "fail-safe" in that any operation beyond the specified tolerances will be apparent to the user.
- All measurement circuits are monitored during use by calibrated instruments or are dependent on external known or calibrated sources of performance within required limits.

When you determine that an instrument falls into the CALIBRATION NOT REQUIRED category, you should annotate the label as to the authority for the decision, such as METRL, the applicable technical manual, and letters or messages from higher authority.

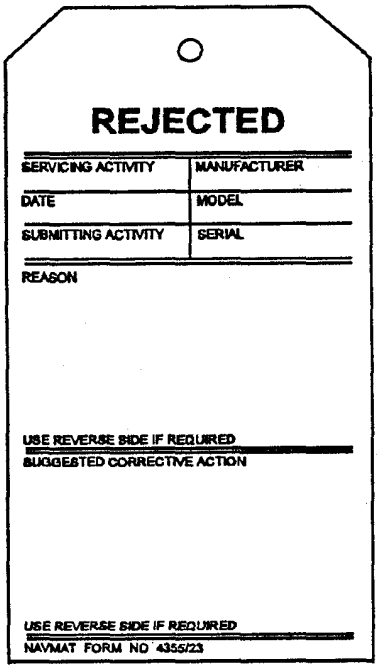
REJECTED.— If an instrument fails to meet the acceptance criteria during calibration and cannot be adequately repaired, a REJECTED label (fig. 13-19, black letters with a red background) is placed on the instrument and all other servicing labels are removed. In addition to the REJECTED label, a REJECTED tag, giving the reason for rejection, is attached to the instrument. This rejection is also entered onto **the** MEASURE format of the instrument. The REJECTED label and tag remain on the instrument until it is repaired and recalibrated. The instrument should not be used while bearing a REJECTED label.

GMNP0517



ORANGE ON WHITE
FORM NO 4355 / 10A

Figure 13-18.—CALIBRATION NOT REQUIRED label.



BLACK ON RED
FORM NO. 4355/12A

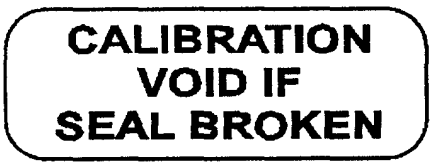
GMNP0518

BLACK ON RED

Figure 13-19.—REJECTED label and tag.

CALIBRATION VOID IF SEAL BROKEN.— The CALIBRATION VOID IF SEAL BROKEN label (fig. 13-20, black letters with a white background) is placed over readily accessible (usually exterior) adjustments to prevent tampering by the user when such tampering could affect the calibration. The label should not be used to cover adjustments or controls that are part of the normal use or operation of the instrument. This label may also be used to prevent removal and/or interchange of plug-ins, modules, and subassemblies when such removal or interchange will affect the calibration.

GMNP0519



BLACK ON WHITE
FORM NO. 4355/14

Figure 13-20.—CALIBRATION VOID IF SEAL BROKEN label.

Repair of Test/Measuring Equipment

Test equipment corrective maintenance is the correction of test equipment troubles, including the repair of an item after a complete breakdown, finding of faults during preventive maintenance, or the tuning and adjustment of an item to restore it to operating condition.

Many fleet activities are reluctant to repair electronic test equipment. However, the Navy expects fleet personnel to perform a certain amount of maintenance and repair of their own test equipment whenever possible. The parts needed to make repairs may already be aboard the ship. It will often be your responsibility to decide when a piece of test equipment should be repaired and who should repair it. You will need to consider the following factors.

Much of the test equipment now being used by naval activities is expensive and is built and calibrated to a high degree of precision. Repair often requires special laboratory facilities and skill. Although each activity should accomplish all repairs within its capabilities, the lack of qualified personnel or adequate facilities limits the kinds of repairs each activity should attempt. Repairs attempted by unqualified maintenance personnel or personnel working in inadequate facilities could result in extensive damage to equipment. Therefore, you should evaluate each piece of test equipment to determine if your personnel should make the repairs, especially when maintenance of test equipment requires repair of critical calibration or frequency-determining circuits. When repairs are accomplished locally, technical manual procedures should be followed carefully; **the repair and assembly of parts should be meticulous.** When your personnel cannot make the repairs or when the necessary post verification is beyond the capabilities and facilities of repair personnel, the equipment should be forwarded to the nearest maintenance activity that has the proper facilities.

Calibration laboratories are authorized to make only incidental repairs, defined as those found necessary during calibration to bring the item within specified tolerances. Before submitting an inoperative item of test/measuring equipment for repair to the maintenance activity, you should note all faults, symptoms, and any other malfunction characteristics on an OPNAV Form 4790/2K and submit the 2K through the proper channels for repair-action screening.

PHYSICAL SECURITY OF CLASSIFIED MATERIAL

LEARNING OBJECTIVE: Discuss the aspects of physical security of GM spaces and classified material.

It is the responsibility of all personnel in the Navy to safeguard military information. Since you may often require the use of classified matter in your work, an understanding of the proper safeguards and control of such matter is essential.

The Department of the Navy Information Security Program Regulations, OPNAVINST 5510.1 (latest revision), is the controlling guide in safeguarding classified information. There is no adequate substitute for continuous day-to-day practice in the proper methods of handling classified material.

Classified information or material may be used only where the proper control facilities are available or under conditions adequate to prevent unauthorized persons from gaining access to it. The exact nature of security requirements depends on a thorough security evaluation of local conditions and circumstances. Security requirements must permit the accomplishment of essential functions while affording classified information appropriate security. The requirements that follow represent the minimum acceptable standards.

RESPONSIBILITIES OF CUSTODIANS

Custodians of classified material should be responsible for safeguarding the material at all times, and particularly, for locking classified material in appropriate security containers whenever it is not in use or under the direct supervision of authorized persons. Custodians should follow procedures which ensure that unauthorized persons do not gain access to classified information or material by sight or sound or other means. Classified information should not be discussed with, or in the presence of, unauthorized persons.

Classified information or material should not be removed from an officially designated office or working area for the purpose of working on such material during off-duty hours. Holding classified material for purposes involving personal convenience is not authorized unless specifically approved by the commanding officer or his or her designee. Prior to approval being granted, it must be determined that

- a compelling necessity exists,
- the required physical security can be provided, and
- a complete list of the removed material will be left with the command.

CARE OF WORKING SPACES

Buildings and spaces containing classified information must be afforded the security measures necessary to prevent unauthorized personnel from gaining access to it. 'This includes the security measures necessary to prevent persons outside the building or spaces from viewing or hearing classified information.

CARE DURING WORKING HOURS

During working hours, you should take precautions to prevent access to classified information by unauthorized persons. Among the necessary precautions are the following:

1. Classified documents, when removed from storage for working purposes, will be kept under constant surveillance and facedown or covered when not in use. Classified material cover sheets, such as OPNAV Form 5216/96, maybe used for this purpose.

2. Classified information will be discussed only when unauthorized persons cannot overhear the discussion.

3. Preliminary drafts, carbon sheets, plates, stencils, stenographic notes, work sheets., and all similar material containing classified information either should be destroyed by an approved method for destroying classified material immediate] y after they have served their purposes or will be given the same classification and safeguarded in the same manner as the classified material they produced.

4. Typewriter ribbons used in typing classified material should be protected in the same manner as required for the highest level of classification for which they have been used. Also, they must be destroyed as classified waste. The following are exceptions:

a. After the upper and lower sections have been cycled through the machine five times in the course of regular typing, all fabric ribbons may be treated as unclassified regardless of their classified use thereafter.

b. Any typewriter ribbon that remains substantially stationary in the typewriter until it has received at least five consecutive impressions may be treated as unclassified.

SECURING CLASSIFIED MATERIAL

Your command should require a security check at the end of each working day to ensure that all classified material is properly secured. The security check should determine the following:

1. All classified material is stored in the manner prescribed.

2. Burn bags are properly stored or destroyed.

3. The contents of wastebaskets that contain classified material have been properly stored or destroyed.

4. Classified shorthand notes, carbon paper, carbon and plastic typewriter ribbons, rough drafts, and similar papers have been properly stored or destroyed.

5. Security containers have been locked by the responsible custodians. The dial of the combination locks should be rotated at least four complete times in the same direction when securing safes, files, or cabinets.

The security check should be made a matter of record with the record retained at least until the next security check is conducted. Optional Form 62 may be used for this purpose.

STORAGE OF CLASSIFIED MATERIAL

Commanding officers are responsible for safeguarding all classified material within their commands and for ensuring that classified material not in actual use by appropriately cleared personnel, or under their direct personal observation, is stored in the manner prescribed for that material.

As a leading Gunner's Mate, you should ensure that any weakness or deficiency found in containers being used for the protection of classified material is reported to the proper authority.

Because they increase the risk of theft, valuables should not be stored with classified material.

Containers should not have external markings that indicate the level of classified information stored within. For identification purposes, however, the exterior of each container should bear an assigned number or symbol.

COMBINATIONS AND KEYS

Combinations to security containers should be changed only by individuals cleared for the highest level of classified material in the container. Combinations should be changed under any of the following circumstances:

1. When the container is first placed in use after procurement.

2. Whenever an individual knowing the combination no longer requires access.

3. When the combination has been compromised or the security container has been discovered unlocked and unattended.

4. At least annually, unless a more frequent change is dictated by the type of material stored therein.

5. When the container is taken out of service. Built-in combination locks should be reset to the standard combination 50-25-50. Combination padlocks will be reset to the standard combination 10-20-30.

In selecting combination numbers, multiples of 5, simple ascending or descending arithmetical series, personal data, such as birth dates, and serial numbers should be avoided. The same combination should not be used for more than one container in any one component of the command.

The combination of a vault or container used for the storage of classified material should be assigned a security classification equal to the highest category of the classified material authorized to be stored in it.

Knowledge of, or access to, the combination of a vault or container used for the storage of classified material should be given only to those appropriately cleared persons who are authorized access to the classified information stored therein and have an operational use for it.

Records of combinations should be sealed in an envelope (OPNAV Form 55 11/2 maybe used) and kept on file by the security manager, duty officer, communications officer, or other person designated by the command.

When key-operated high-security padlocks are used, the keys should be controlled as classified material of a classification equal to the classification of the material being protected and should be safeguarded as follows:

1. A key and lock custodian should be appointed to ensure proper custody and handling of keys and locks used for protecting classified material.

2. A key and lock control register should be maintained to identify keys for each lock and their current location and custodian.

3. Keys and locks should be audited each month.

4. Keys should be inventoried with each change of custodian.

5. Keys should not be removed from the premises.

6. Keys and spare locks should be protected in a security container.

7. Locks should be changed or rotated at least annually, and should be replaced upon loss or compromise of their keys.

8. Master key is prohibited.

A record should be maintained for each vault, secure room, or container used for storing classified material. This record should show the location, and the names, home address, and home telephone numbers of persons having knowledge of the combination to the storage facility. GSA Optional Form 63 or OPNAV Form 5511/30 may be attached to the container to identify the custodian. When Optional Form 63 is used, a privacy act statement should be provided to those listed and their consent obtained before any prominent display is allowed.

Electrically actuated locks (e.g., cipher and magnetic strip card locks) do not afford the degree of protection required for classified information and should not be used as the locking device on security containers.

REPRODUCTION OF CLASSIFIED INFORMATION

Classified information is normally prepared, printed, and reproduced by Department of the Navy or Department of Defense facilities. When this is not possible, the preparation, the printing, and the reproduction of classified information is authorized by the following:

1. For Top Secret material:

a. Only as specifically approved by the Director, Navy Publications and Printing Service.

2. For Secret and Confidential material:

a. Government Printing Office

b. In commercial facilities having an active facility clearance at least as high as the classified information to be processed and obtained according to the requirements of the Department of Defense industrial security regulation and when specifically approved by the Director, Navy Publications and Printing Service.

Printing, Duplication, and Reproduction of Classified Material

The Director, Navy Publications and Printing Service, is responsible to the Commander, Naval Supply Systems Command, for the technical guidance and distribution of all Navy classified publications.

From a security viewpoint, the printing, the duplication, or the reproduction of classified material poses many problems: (1) it contributes to the increasing volume of classified material; (2) it permits quick and easy production of uncontrolled material containing classified information; (3) the equipment or processes require care or special procedures to prevent or eliminate latent impressions or offset versions of the classified information; and (4) a quantity of excess and waste material is produced, which can contribute to compromise of the classified information. Therefore, local commands must require close supervision and careful control of all reproduction facilities under their jurisdiction. Of particular importance is the need to control and supervise the use of office copying machines for the printing, the duplication, or the reproduction of classified material and to assure the proper recording and safeguarding of the classified material reproduced by such means. In no event, however, should classified material be reproduced without the approval of competent authority.

Destruction of Classified Material

For instructions regarding the destruction of classified material, refer to OPNAVINST 5510.1 (latest revision).

TRAINING

LEARNING OBJECTIVES: Discuss the different types of training available to GMs and the importance of each.

Because of the mission of the Navy, warships and aircraft are equipped with highly complicated devices used for the detection, engagement, and destruction of the enemy. To achieve the designed degree of effectiveness, highly skilled personnel are needed to maintain and operate this equipment. Naturally, these skills are obtained through the various training programs provided by the Navy. The basis of all training is the development of these skills within the individual. Group training can only be accomplished if all individuals involved have been trained to the basic level of knowledge of the required skills. For example, before a damage control party can perform efficiently, each member should be qualified at his or her assigned position within that party. These qualified individuals can now be trained to work together as a team, performing a procedure based on several independent functions.

As a supervisor, you are going to be very heavily involved in the process of training personnel. Your involvement may include any number of procedures—from the planning of these training programs to the actual training of personnel. Generally, training is considered to be one of two types—formal or informal.

FORMAL TRAINING

The best definition of formal training is training that is conducted off the ship or out of your unit. A Sailor's first exposure to formal training is recruit training. Once he or she leaves boot camp, training really begins in earnest. The first duty assignment may be to a class A school to get initial rate training. This is followed by an assignment to a new command, which may or may not involve assignment to other rate or duty-related training. For example, a person could possibly attend a class C school directly after graduating from an A school. He or she could be assigned to a precommissioning school or a damage control school. Other formal training is provided by such activities as fleet training groups (FTGs), mobile technical units (MOTUs), or nuclear weapons training groups (NWTGs).

Naval commands frequently send their personnel to TAD to formal schools to upgrade their skills in all areas of performance including military, in-rate, and administration. The *Catalog of Navy Training Courses (CANTRAC),* NAVEDTRA 10500, lists all formal courses of instruction offered to naval personnel. This catalog is published in microfiche form and contains the following information about each of the courses listed:

Course location

Course length

Class school (A, C, or P)

How frequently the course convenes

Purpose of the course

Scope of the course

Prerequisites for personnel attending the course

Quota control information

Reporting destination

The CANTRAC is normally maintained by the educational services officer (ESO).

INFORMAL TRAINING

For all practical purposes, informal training can also be called shipboard training because it is conducted within the working environment. Many different types of informal training can be conducted, but to describe them all here would be impractical. Instead, some of the more frequently used types are identified in the following paragraphs to make you aware of how extensive informal training really is.

Navy Correspondence Courses

In most cases, Navy correspondence courses are a prerequisite to taking an advancement examination. You are working on one right now. They can be completed at your leisure and at a pace that is comfortable for you. Remember that correspondence courses are not limited to training in a particular rate/rating. Several hundred courses are available, covering a large number of technical, administrative, and scholastic skills. A complete list of correspondence courses available is contained in the *Catalog of Nonresident Training Courses,* NAVEDTRA 12061.

Assist Visits

Traditionally, an assist visit is viewed as a working inspection; but this is far from true. The real purpose of an assist team is to observe your operations or performance and provide instruction to correct any problem areas observed. These assist visits are conducted by activities, such as MOTU, NAVSEA, FTG, or even by factory representatives investigating equipment problems. As a rule, an assist visit is not a graded evolution; it is provided to help you in preparing for an operational evolution.

On-the-Job Training (OJT)

On-the-job training is the most common form of informal training available. It is also the easiest, because, in most cases, it is provided while performing in the working environment. Although the basics of most tasks can be provided in the classroom, nothing can replace the hands-on experience gained in learning about any particular task, watch station, or a piece of equipment. OJT is usually provided during drills, watches, and actual operational evolutions. Ships' crews are largely made up of experienced technicians. As one of those senior technicians, it is your responsibility to pass on your skills and expertise to those you work with to maintain and improve the maximum efficiency of your unit. One of the better aspects of OJT is that while a person is being trained on the job, he or she is also undergoing other forms of informal training at the same time. For example, if a person is standing a watch under your instruction, he or she is also learning and demonstrating the required PQS skills for that watch station. He or she may also be receiving instructions or information that may be provided through general military training.

General Navy Training (GNT)

General Navy training is conducted at every unit for virtually everyone in the Navy. GNT is used to make personnel aware of all the knowledges and skills necessary to function from day to day within the Navy environment. In other words, information is passed that should become general knowledge to all naval personnel. A wide variety of subjects are covered through GNT and to list them all would be nearly impossible. You should know, however, that each command is responsible for maintaining a GNT program. Guidelines governing the organization and implementation of the GNT program are provided in the

unit's *Standard Organization and Regulations Manual* (SORM).

Personnel Qualification Standards (PQS)

The PQS Program is a qualification system for officer and enlisted personnel to perform certain duties. A PQS is a compilation of minimum knowledge and skills necessary to qualify for a specific watch station, maintain specific equipment, or perform as a team member within a unit.

Watch stations refer to those watches normally assigned by a watch bill, and in the majority of cases, are operator oriented. Maintenance standards are tasks pertaining to technical upkeep of systems of units of equipment, such as a 5"/54 Mk 45 group maintenance supervisor. Performance of a team member can best be described as standards that refer to the knowledge and skills appropriate for standardized qualifications that are not peculiar to a specific watch station or piece of equipment but apply more broadly within the unit, such as a member of a damage control party.

A complete list of all PQS materials currently available in the Navy supply system is contained in the *PQS Catalog,* NAVEDTRA 43100-5, which is updated quarterly. For further information describing the implementation, logistics, and management of the PQS program, refer to the *Personnel Qualification Standards (PQS) Management Guide,* NAVEDTRA 43100-1.

The PQS program is not designed as a training program but provides many training objectives. PQS should be used as a key element of a well structured and dynamic unit training program. Training, especially at the informal (or shipboard) level, is a constantly ongoing process. These are not all of the training processes in existence, but the ones you will encounter most frequently.

EFFECTIVE TRAINING

LEARNING OBJECTIVES: Discuss how you can make available training effective.

Since we have identified the importance of training, we must also point out the importance of the ability to conduct this training; in other words, the ability to be an effective teacher. Any time you show someone how to do something, you have performed the function of being a teacher. As a supervisor, you are going to be called upon more and more to fill this role. You are expected to impart your accumulated skills and experience to your personnel as necessary to make them efficient in the performance of their duties. You should be able to teach by both the formal and the informal methods. The majority of the instruction you will provide is going to be informal. You maybe required to teach personnel in a number of areas, ranging from general military information and skills to the performance of a specialized technical operation.

To be an effective teacher, you should have some specific skills as well as being adequately prepared. First, you should be well versed and very knowledgeable in the material that you are teaching. It is virtually impossible to impart a level of knowledge to someone if you do not understand what you are teaching in the first place.

No matter what you are trying to teach, you should take a personal interest in the preparation and presentation of the material involved. If you stand up in front of a group of people and speak in a monotone, displaying an attitude of obvious boredom, you have failed as an instructor and wasted a lot of valuable time. This type of attitude tells whoever you are trying to teach you do not believe what you are telling them is important or worth knowing about. Consequently, they are not going to pay attention to what you say or do, because they also are going to become bored and disinterested. When preparing your instruction or lesson plan, you should look for ways to make the material you plan to present as interesting as possible. Repetition should only be done to emphasize the importance of the material being presented.

One of the most important attributes of a supervisor (an instructor) is **self-confidence.** A person's confidence is based upon one's knowledge of the job, and most importantly, one's own personal belief in his or her abilities. Confidence begets confidence. A weak or unsure supervisor will not inspire confidence in the people around him or her. A supervisor who demonstrates his or her knowledge, and the confidence to use that knowledge, will usually inspire others to attempt to gain and use the same knowledge.

Just as is true inmost other operations, training also includes a certain degree of quality control. This is accomplished through such media as testing, questionnaires, and demonstration of the skills acquired from the training. What you are doing is determining whether or not the training you conduct is actually successful

All training should be conducted with the maximum technical support available. This technical support may be available in the form of publications, procedural guides, information handouts, safety precautions, and even hands-on operations. The more you can reinforce the subject matter being taught with examples, the more likely the material you are teaching will be retained by the students.

MANAGEMENT OF SHIPBOARD TRAINING

Because of the enormous amount of training involved at the shipboard level, close attention should be paid to ensure that a workable training plan is instituted aboard your ship. Depending upon such variables as the size of your ship, the number of personnel in the crew, and the ship's mission, the methods of training are going to vary. But no matter what the size of the ship and crew, you are going to be involved in the planning and implementation of the on-board training program. A typical table for the organization of shipboard training is shown in figure 13-21.

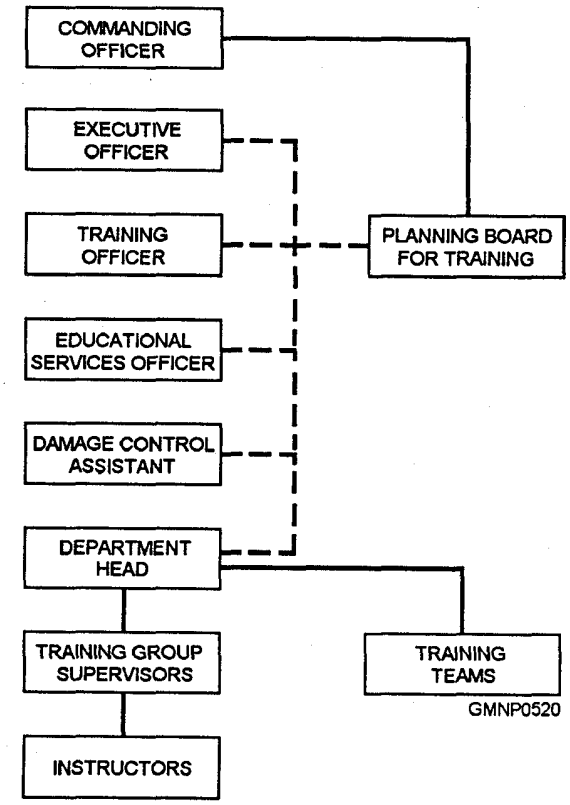


Figure 13-21.—Shipboard training organization.

PLANNING BOARD FOR TRAINING

The Planning Board for Training (PB4T) is responsible for developing and maintaining an ongoing unit training program. This board reports to the commanding officer, and, as a minimum, should be comprised of the following personnel:

Executive officer (also designated as the chairperson)

Department heads

Damage control assistant

Educational services officer

Training officer

Command master chief

3M coordinator

Medical officer (or senior corpsman)

Safety officer

Other personnel may be assigned to the planning board as required by specific training evolutions. Although you should be familiar with most of the personnel in the above list, it should be pointed out that the training officer is a separate (or collateral) billet as required by the size of the command. The training officer is designated by the commanding officer to assist the executive officer in the execution of the command training programs. He or she has specific duties within the scope of the training mission of the command that should not be confused with the duties of the educational services officer (ESO).

The Planning Board for Training meets at least on a monthly basis and primarily performs the following general functions:

1. Assist the commanding officer in the establishment of command training policies.

2. Establish the training program for the command and periodically reviews schedules within the training program to evaluate training effectiveness and progress.

3. Establish a training syllabus for officers and another for enlisted personnel.

This is by no means the extent of the responsibilities of the PB4T. The board can meet as often as deemed necessary by the chairman and may include whatever personnel required to perform the specific training functions. Guidelines for the Planning Board for Training are located in *Standard Organization and Regulations of the U.S. Navy (SORM), OPNAVINST*

3120.32. These guidelines are also provided in the individual SORM of the command.

TRAINING PLANS

LEARNING *OBJECTIVES:* Discuss ship or station training plans and how they impact on readiness.

Now that your ship's training organization has been established, the next step of the training process is to determine what training is necessary and get it scheduled. If you look at the amount and variety of training for your particular ship's crew, you should realize what a large undertaking this can be. Training has to be scheduled and accomplished for virtually every member of the ship's company. It is required in all areas-from every day shipboard routine to specifics in rate skills necessary for an individual to perform his or her duties within the work center. As you can see, training plans are important tools in the control of training programs at all levels aboard ship. Shipboard training plans (or schedules) are of two types-long-range and short-range. These plans should be developed by taking into account the ship's operating schedule, daily routine, availability of required personnel, and any evolution that may affect scheduling.

LONG-RANGE TRAINING PLAN

The long-range training plan is the basic instrument for the planning and recording of all training schedules and is used to keep all personnel informed of projected training goals and operating schedules. This schedule is initially developed and maintained by the department head and training officer. The department head is responsible for consolidating the training information for his or her department. He or she will forward it to the training officer. The training officer then consolidates the long-range plans received from all the department heads, adds all unit level training requirements (e.g., GNT, indoctrination training), and presents it to the executive officer for review. The plan then goes to the commanding officer for approval. Once approved, this package becomes the unit's long-range training plan. A copy of applicable portions is provided to each training group (work center, team, etc.). This plan provides the framework for the preparation of the quarterly and monthly training plans, which contain more detailed information about each of the training requirements, The long-range training plan should be prepared using an OPNAV Form 3120/1A (fig. 13-22), and training events should be prioritized in the following sequence:

- Schedule fleet exercises, trials, inspections, and any other major evolutions that may be required by the type or fleet commanders.
- Schedule all required exercises required by the type commander to maintain a state of C1 readiness.
- Schedule any other applicable unit exercises.
- Schedule all other unit training. Some examples of unit training are damage control lectures, security force training, general Navy training (GNT), and telephone talker/lookout training.

Once the long-range plan has been developed and implemented, then the short-range training plan is setup and put into operation.

SHORT-RANGE TRAINING PLAN

Because of the complexity of the day-to-day operations of a ship, you should pay careful attention to the scheduling of training evolutions. A short-range training plan enables your unit to anticipate how much training can actually be accomplished, based upon the planning for short periods of time in the future. Initially, the short-range training is developed at PB4T, but the plan is carried out at all levels of training within the unit. Basically, the short-range training plan encompasses the quarterly, monthly, and weekly training plans.

Quarterly Training Plan

During the Planning Board for Training of the last month of a quarter, the training officer should distribute copies of the Quarterly Employment Schedule to all of the board members. This schedule provides information about the ship's operational commitments, such as deployments and overhaul periods. Using it as a planning guide, the PB4T develops broad unit training plans for the upcoming quarter. The purpose of this quarterly training plan is to inform the individual training groups of any unit plans that may affect the scheduling of training group evolutions. Once the quarterly plan has been developed for the whole unit, department heads then insert any additional departmental plans or evolutions and distribute the plan to the groups within their respective departments. The scheduling of any training during periods of less than a quarter in length should be accomplished at the

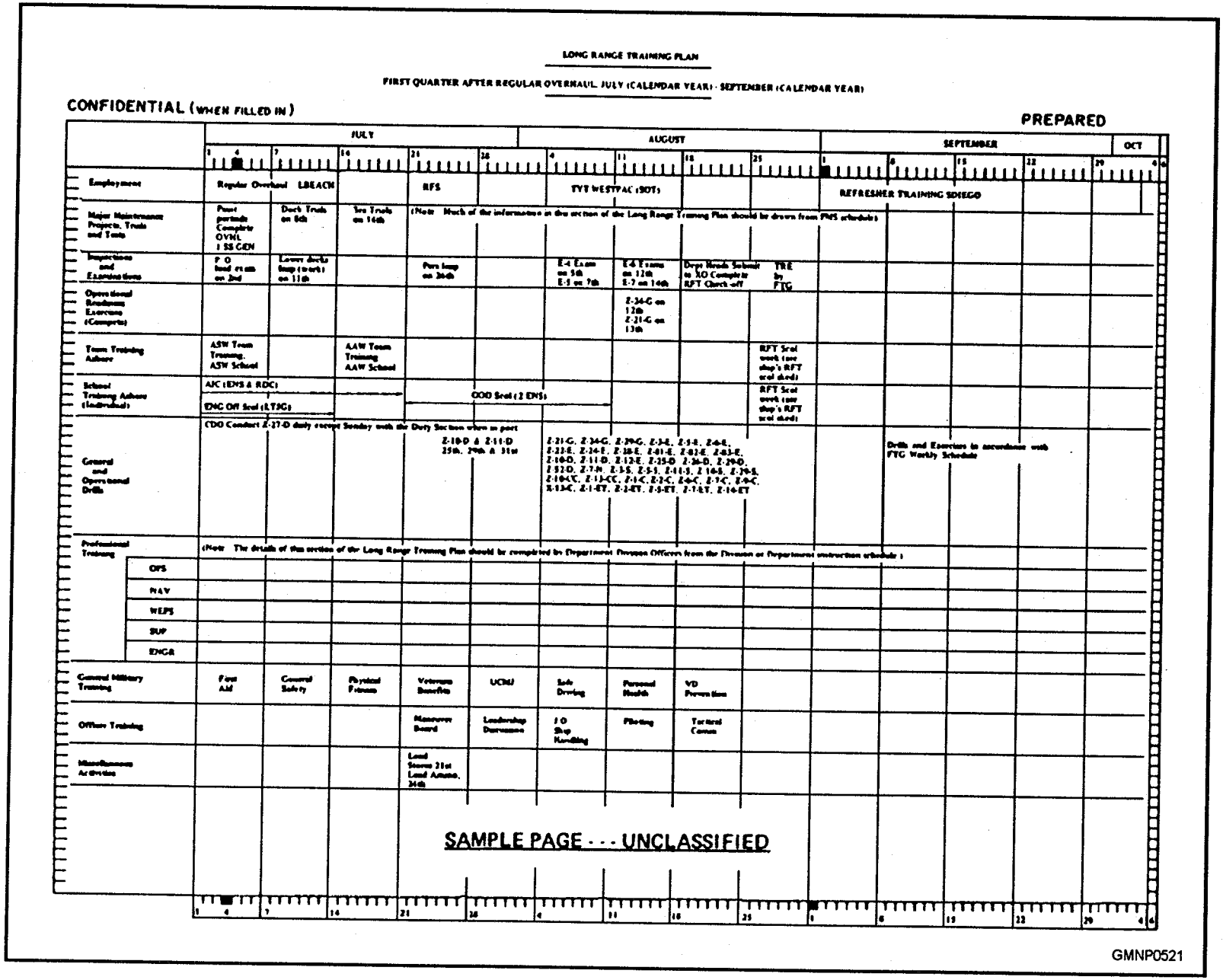


Figure 13-22.—Long-Range Training Plan.

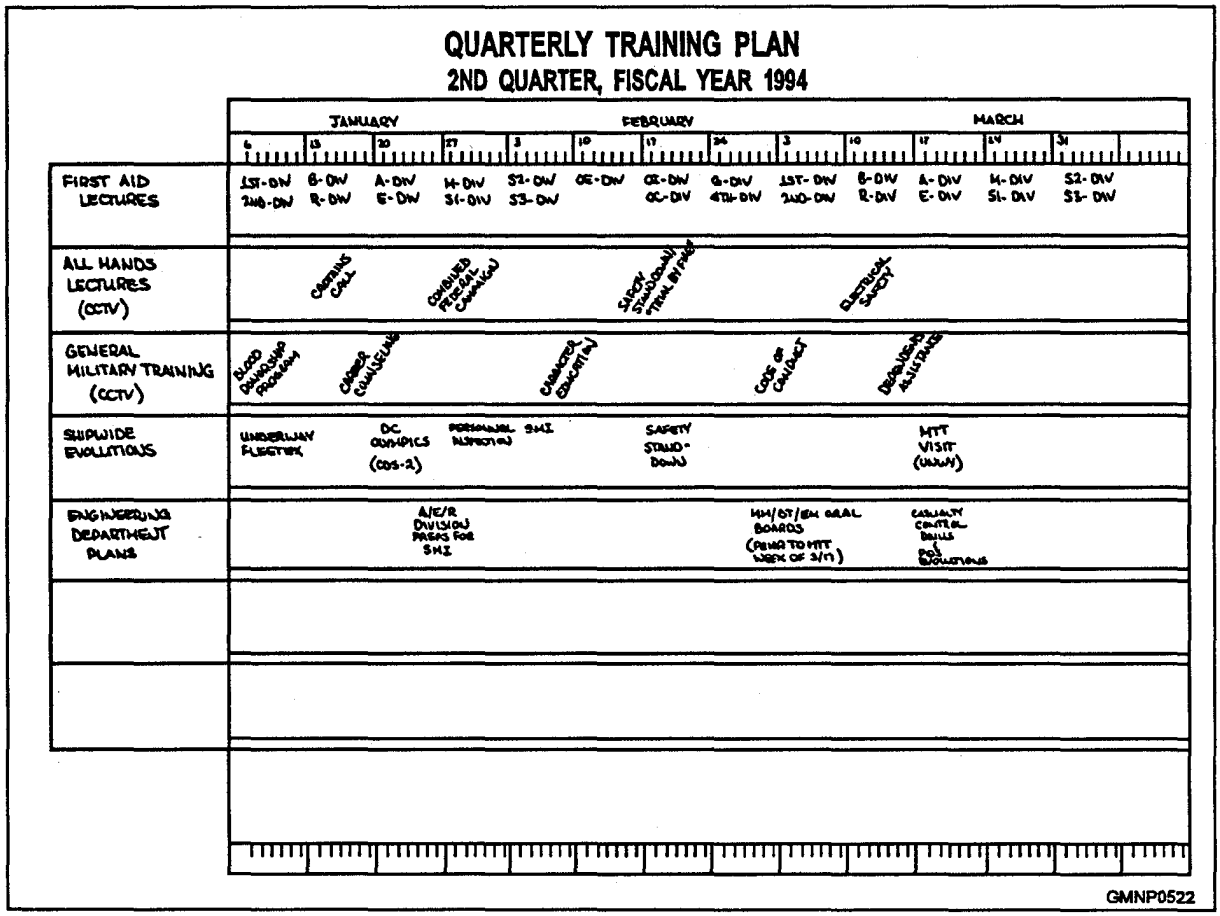


Figure 13-23.—Quarterly Training Plan.

MONTHLY TRAINING PLAN GMNP0523

MONTH OF MARCH 1994 TRAINING GROUP B-DIVISION

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3	4 B40 - VALVE MAINTENANCE BTCS ALFA	5
6	7 B8 - 1200# AUX STEAM SYSTEM BT2 HOTEL	8 EMOW ORAL BOARDS	9 B35 - F.O. XFER AND STORAGE BT2 GOLF	10 BT L/L ORAL BOARDS	11 B38 - ABC SYSTEM BT1 DELTA	12
13	14 B42 EOSS USE LT WILCOX	15 MMOW ORAL BOARDS	16 B46 - COLD/HOT CHECKS BTCS ALFA	17 BTOW ORAL BOARDS	18 B45 MLOC PROCEDURES LT WILCOX	19 LIGHT-OFF UNDERWAY AM 3/17 FOR MTT
20	21 B50 - HEAT STRESS BT2 FOXTROT	22 UNDERWAY ENGINEERING MOBILE TRAINING TEAM VISIT PQS EVOLUTIONS & CASUALTY CONTROL DRILLS	23	24	25	26
27	28 B52 BOILER LAYUP BTC BRAVO	29 EOOW ORAL BOARDS	30 B48 - EEBD BT1 ECHO	31 MM MESS ORAL BOARDS		

SUBMITTED BY: J. R. Frost, LT, USN
B-DIVISION OFFICER

APPROVED BY: J. A. Doe, LCDR, USN
CHIEF ENGINEER

Figure 13-24.—Monthly Training Plan.

departmental level. Figure 13-23 shows a Quarterly Training Plan that might be used aboard ship.

Monthly Training Plan

Using the quarterly training plan as a guide, each training group (or work center) submits a proposed monthly training plan to their cognizant department head. This schedule should be provided to the department head no later than the last week of the month. It should indicate what training is to be conducted during the following month, on what days it will be held, and who will conduct the training. The department head receives the monthly plans from all of the groups within his of her department. They serve as his or her primary input for the scheduling of training at PB4T. The monthly training plan for an engineering division is shown in figure 13-24, but remember that this schedule is also maintained at the department and unit levels.

Weekly Training Plan

Each week the department head should provide his or her training groups with a weekly schedule for training. Basically, this schedule should include all training applicable to his or her department, but each division should get this weekly training plan for the planning of their own division-level training evolutions. No changes should be made to this schedule without the approval of the department head. As shown in figure 13-25, information provided in the weekly training plan should include, as a minimum, the training to be held, the time it is to be conducted, and where it is to be conducted.

WEEKLY TRAINING SCHEDULE

WEEK OF: 6-12 MARCH 199 DEPARTMENT ENGINEERING

SUNDAY 3/6	MONDAY 3/7	TUESDAY 3/8	WEDNESDAY 3/9	THURSDAY 3/10	FRIDAY 3/11	SATURDAY 3/12
DUTY SECTION I DUTY ENGINEER EXERCISE BOTH FIRE PARTY AND R&A TEAM	0815 FIRST AID LECTURE R-DIV MESS DECKS - HM1 PILL 1230- DIV TRNG A- A13 AC&R BOAT SHOP HM1 ROMEO B- B42 EOSS/EOOC LT WILCOX BEATHING COMP M- M42 EOSS/EOOC LT WILCOX BEATHING COMP E- E12 SP PUMPS IC SHOP IC2 MIKE R- R14 P-250 HT SHOP HT3 TANGO	1000- ALL HANDS ELECT SAFETY ON CCTV 1300- CAPTAIN'S MAST 1600- MMOW ORAL BOARDS IN CHIEFS MESS	1230- DIV TRNG A- A11 REEFERS BOAT SHOP HM2 SIERRA B- B46 COLD/HOT CHECKS BTCS ALFA BEATHING COMP. M- M46 COLD/HOT CHECKS HMCM SMITH FWD E.R. E- E31 GYROS IC SHOP IC3 PAPA R- R5 HKV GASKET HT SHOP HT2 OSCAR	0815 FIRST AID LECTURE R-DIV MESS DECKS - HM1 PILL 1500- DUTY EOB COMMENCE MLOC PROCEDURES FOR SATURDAY LIGHT OFF 1600- BTOW ORAL BOARDS IN CHIEFS MESS	1230- DIV TRNG A- A37 MAIN DRAIN BOAT SHOP EN1 PETERS B45 MLOC BEATHING COMP LT WILCOX M-M45 MLOC BEATHING COMP LT WILCOX E- E17 SSTGS IC SHOP EM1 DOLAN R- R40 TAIL HT SHOP LTJG WILLIAMS	DUTY SECTION III DUTY ENGINEER EXERCISE BOTH FIRE PARTY AND R&A TEAM 1500 LIGHT FIRES IN 1A BOILER - MTT VISIT NEXT WEEK - ALL DIV OFFS ENSURE PERSONNEL ARE BRIEFED ON SCHEDULE

PROMULGATED BY: J. A. Doe, LCDR, USN
CHIEF ENGINEER

GMNP0524

Figure 13-25.—Weekly Training Plan.

TRAINING RECORDS

LEARNING OBJECTIVES: Discuss the importance of up-to-date and thorough training records.

Try to remember how many different kinds of training you have received during your years in the Navy. Now imagine how your service record would look if all of this training had been entered into it in a hodgepodge manner. It would certainly be a lot of paperwork, to say the least. For this reason, training records should be kept to an absolute minimum. Usually, your personnel record will contain only the formal schools and training you have received. Certain major PQS accomplishments or watch stations may also be considered significant enough to be recorded in an individual's service record. However, most PQS accomplishments should be treated in the same manner as GNT and placed in the division records accordingly. It is still important to maintain some kind of on-board records to keep track of what training has been conducted, when it was conducted, and what personnel received the training. One of the simplest ways of recording training is by use of the General Record (Type II) (OPNAV Form 1500-31). Figure 13-26 shows the

GENERAL RECORD (Type II)
OPNAV FORM 1500-31 (10-80)
S/N 0107-LF-701-0000

PERIOD COVERED FROM 3/6/86 TO

TITLE
B-DIVISION TRAINING RECORD

COLUMN CAPTIONS	3/10/86 BAS EOSS REDUCTION LT WILCOX	3/11/86 ELECT SAFETY CCTV	3/12/86 B46 WATCHBOARDS BTCS ALFA	3/13/86 FIRE AID-BOARD LIMA BRAVO	3/13/86 BRAV DRAL BOARDS	3/14/86 B45 MIAC LT WILCOX			
BTCS A.A. ALFA	X	X	INST.	X	BOARD MEMBER	X			
BTC B.B. BRAVO	X	X	X	X	BOARD MEMBER	X			
BT1 C.C. CHARLIE	X	X	X	X	X	X			
BT1 D.D. DELTA	X	X	X	X	X	X			
BT1 E.E. ECHO	X	X	X	X	X	X			
BT2 F.F. FOXTROT	X	X	X	X	X	X			
BT2 G.G. GOLF	X	X	X	X	X	X			
BT2 H.H. HOTEL	LV	LV	LV	LV	X	X			
BT3 I.I. INDIA	X	X	X	X	NA	X			
BT3 J.J. JULLIET	X	X	X	X	NA	X			
BT3 K.K. KILO	X	X	X	X	NA	X			
BT3 L.L. LIMA	X	X	X	X	NA	X			
BT3 M.M. MIKE	LIB	X	X	X	NA	X			
BT3 N.N. NOVEMBER	X	X	X	X	NA	X			
BT3 O.O. OSCAR	X	X	X	X	NA	X			
BT3 P.P. PAPA	X	X	X	X	NA	X			
BT3 R.R. ROMEO	X	X	X	LIB	NA	X			
BT3 S.S. SIERRA	X	X	X	X	NA	X			
BTFN T.T. TANGO	LIB	X	X	X	NA	X			
BTFA U.U. UNIFORM	X	X	X	X	NA	X			
BTFA V.V. VICTOR	X	W.P.	X	X	NA	X			
FA W.W. WILLIAM	X	X	X	X	NA	X			
FA X.X. XRAY	X	U.A.	U.A.	U.A.	NA	U.A.			
FA Z.Z. ZEBRA	X	X	X	X	NA	X			

GMNP0525

Figure 13-26.—Division Training Record.

use of this form in recording training conducted for an entire division. This form could also be used to record an individual's on-board training. These local records should be maintained by the group supervisor for as long as the individuals listed maybe assigned to the unit.

Another important local record with which you may be concerned is the Division Officer's Personnel Record Form (NAVPERS 1070/6). Although this form is not strictly a training record, it does contain personal, training, and qualification information regarding assigned personnel. This form (figs. 13-27A and 13-27B) is required to be maintained as part of the Division Officer's Notebook. If it is maintained properly, it is an invaluable source of information regarding an individual's training accomplishments while he or she has been aboard. This form, and any other personal record of training the individual has received while aboard, should be given to him or her upon his departure from the command As stated before, the use of training records should be kept to a minimum, but whatever training records are used should be maintained as correctly and as up-to-date as possible.

SUMMARY

Although this chapter is titled "Administration and Training," its primary purpose is to make you aware of the more complicated administrative and training procedures involved at the management level. Use of the CSMP, PMS reports, local logs, and admin and training records were demonstrated as valuable aids in analyzing equipment and personnel trends. These records can be invaluable to you in the prediction of breakdowns or conditions that might affect your work center or the operational capabilities of your ship. The need for the organization and maintenance of technical libraries has also been described.

In somewhat more detail, the functions and some procedures have been provided regarding CSRRs/CSRTs, the casualty reporting (CASREP) system, and the management of conventional ammunition (including the basic guidelines for ammunition transaction reporting).

The calibration and repair of test equipment and measuring tools has been described with the emphasis placed on the administrative and follow-up processes of the METCAL Program.

A short segment has been provided to emphasize the importance of effective instruction and supervision of training programs.

Also described in this chapter is a discussion on how shipboard training is organized and administered via the Planning Board for Training, including the development and implementation of long-range and short-range training plans at the unit, department, and division levels of management.

Finally, a brief description of local training records is included to inform you of what is available to you for the documentation of training aboard your unit.

Because it is impractical to provide all the information about these programs in this text, we have noted the reference publications and instructions you will need to assist you in the more important administrative and training functions in which you winy probably become involved.

DIVISION OFFICER'S PERSONNEL RECORD FORM
NAVPERS 1070/6 (REV.9-75)
S/N 0106-LF-010-7035

PRIVACY ACT STATEMENT

Authority to request the information in this form is derived from 5 United States Code 301, Departmental Regulations. Purpose of this form is to provide the Division Officer with readily accessible data concerning personnel in his/her division. The information is used by the Division Officer to manage and administer his / her personnel; to determine training needed; to record training completed; to maintain readily accessible data concerning performance, work assignment, and other personnel data to enable the Division Officer to guide and counsel those assigned to him / her. Disclosure of the following items of information on this form is manditory: name, rate, SSN, local address and phone number (if applicable), billet space / living space / bunk number (if applicable). Disclosure of the following item of information is voluntary: reenlistment intentions, rate desired, special qualifications, name of wife, names and ages of children. Other items of information may be obtained from member's service record. Failure to provide those required items of information listed above may result in administrative action being taken; no action will be taken if the individual refuses to disclose those voluntary items of information.

NAME	RATE	☐ USN ☐ USNR	SSN	NEC / PRI / SEC

DIVISION	SECTION	BILLET SPACE	LIVING SPACE	BUNK NUMBER

DATE OF BIRTH	RELIGION	SECURITY CLEARANCE

DATE OF FIRST ENLIST.	DATE REPORTED ABOARD	EXPECTED LOSS DATE	REENLISTMENT INTENTIONS

DATE OF PRESENT RATE	RATE DESIRED	ELIGIBLE NEXT RATE	CONTINUOUS SERVICE

SPECIAL QUALIFICATIONS OR INTERESTS	GENERAL QUARTERS STATION
	UNDERWAY WATCH STATION

PERMANENT HOME ADDRESS AND PHONE NUMBER	LOCAL ADDRESS AND PHONE NUMBER

MARITAL STATUS	NO. OF DEPENDENTS	NAME OF WIFE

NAMES AND AGES OF CHILDREN

NEXT OF KIN	RELATIONSHIP	ADDRESS AND PHONE NUMBER

PREVIOUS DUTY				LEAVE RECORD				
DATE REPORTED	UNIT	DIVISION	DESCRIPTION OF DUTY	FROM	TO	TYPE	NO. DAYS	BALANCE

SEMI-ANNUAL MARKS

PERIOD ENDING	PROFESSIONAL PERFORMANCE	MILITARY BEHAVIOR	LEADERSHIP AND DUPERVISORY ABILITY	MILITARY BEARING	ADAPTABILITY

GMNP0526

Figure 13-27A.—Division Officer's Personnel Record Form (front).

DIVISION OFFICER'S PERSONNEL RECORD FORM
NAVPERS 1070/6 (Rev. 9-75) (Back)

AWARDS AND COMMENDATIONS

DISCIPLINARY RECORD

FORMAL EDUCATION

HIGH SCHOOL				MAJOR SUBJECTS
9	10	11	12	
COLLEGE				
1	2	3	4	

BASIC BATTERY SCORES

GCT	ARI	MECH	CLER	ETST	SONAR	RADIO	FLAT

GED

☐ HIGH SCHOOL ☐ COLLEGE	PART I SCORE	PART II SCORE	PART III SCORE	PART IV SCORE	PART V SCORE

NAVAL EDUCATION AND ADVANCEMENT RECORD

ITEM	TITLE	DATE COMPLETED	MARK	TITLE	DATE COMPLETED	MARK
SERVICE SCHOOLS						
MILITARY CORRESPONDENCE COURSES						
OTHERS						

PRACTICAL FACTORS		SERVICE-WIDE RATING EXAMINATIONS		
RATE	DATE COMPLETED	DATE	RATE	RESULTS

FIRST AID	SWIM	TEL. TALKER	FIRE FIGHT'G	DRIVER	TRUCK DRIVER	BUS DRIVER	COX'SN	BOAT ENG.					

PROFESSIONAL QUALIFICATION STANDARDS							
WATCH	DATE COMM	% PROGRESS	DATE QUAL	WATCH	DATE COMM	5 PROGRESS	DATE QUAL

GMNP0527

★U.S. Government Printing Office: 1983 - 605 - 010 / 6509 2 - 1

Figure 13-27B.—Division Officer's Personnel Record Form (back).

APPENDIX I

GLOSSARY

A-END— hydraulic pump that controls the output of the B-end through a valve plate and a constant speed motor.

AAW— Anti-air warfare.

ASUW— Anti-surface warfare.

ASW– Anti-submarine warfare.

AUR— All up round.

B-END— Converts fluid power from the A-end into a rotary mechanical motion.

BASE— The after end of the projectile.

BENCH MARKS— Installed for each equipment that has an alignment telescope and used throughout the life of the ship to verify alignment.

BICONVEX— A supersonic fin shape that causes considerable drag but is the strongest fin design.

BITE— Built-in test equipment.

BODY– The main part of the projectile and contains the greatest mass of metal.

BOURRELET— The smooth machined area that acts as a bearing to stabilize the projectile during its travel through the gun bore.

C&D— Command and Decision.

CAB UNIT— An A-end and B-end combination.

CCS— Central control station, same as Damage Control Central (DCC) on some ships.

CENTER-LINE REFERENCE MARKS— Established during initial construction to represent the ship's center line.

CENTER-LINE REFERENCE PLANE (CRP)— The reference used to establish the train zero alignment of all of the combat system equipment aboard ships.

CIC— Command information center.

CONREP— Connected replenishment between ships.

CONTROL SURFACE— Provides the necessary steering corrections to keep the missile in proper flight attitude and trajectory.

CONTROL SYSTEM— Responds to orders from the guidance system and steers the missile toward the target.

CONTROLLED AREA— A security area that surrounds an exclusion area.

CORRECTIVE MAINTENANCE— The replacement of components that are identified as worn, defective, or broken.

COSAL— An established shipboard allowance of parts for installed equipment.

CROSS WIND— The wind that blows at the right of the LOF.

CSMP— Current ships' maintenance project.

CYCLIC RATE OF FIRE— The maximum rate at which a weapon will fire in automatic operation, stated in rounds per minute.

DCC— Damage control central, same as Central Control Station (CCS) on some ships.

DEAD TIME— The time interval between the instant the fuze is set and the instant the projectile is fired.

DETONATORS— A device used in initiating high-explosive bursting charges.

DoD— Department of Defense.

DORSAL FIN— The stationary fin provided for in-flight stability and some lift.

DoT– Department of Transportation.

DOUBLE WEDGE— A supersonic fin shape that offers the least drag but lacks strength.

DRAG— The resistance offered by the air to the passage of the missile through it.

DTRM— Dual thrust rocket motor made of a solid-fuel propellant.

DUD-JETTISON UNIT— Ejects missiles overboard that fail to fire and are unsafe to return to the magazine.

EFFECTIVE CASUALTY RADIUS— The radius of a circular area around the point of detonation within which at least 50 percent of the exposed personnel will become casualties.

ELECTRICAL ZERO— The reference point for alignment of all synchro units.

ESCU— Electronic servo control unit.

ESI– Explosive safety inspection.

ESM— Electronic support measures.

EW— Electronic warfare.

EXCLUSION AREA— A security area that contains one or more nuclear weapons or one or more components of a nuclear weapon.

EXPLOSION— The practically instantaneous and violent release of energy which results from a sudden chemical change of a solid or liquid substance into gases.

EXPLOSIVES— Those substances or mixtures of substances that when suitably initiated by flame, spark, heat, electricity, friction, impact, or similar means, undergo rapid chemical reactions resulting in the rapid release of energy.

EXUDATE— A mixture of lower melting isomers of TNT, nitrocompounds of toluene of lower nitration, and possible nitrocompounds of other aromatic hydrocarbons and alcohols.

FCS— Fire control system.

FIXED AMMUNITION— Ammunition that has the cartridge case crimped around the base of the projectile.

FLASH POINT— The temperature in which lubricants give off a vapor.

FOD— Foreign object damage.

FUZES— The initiating device that detonates the warhead (payload).

GCP— Gun control panel.

GMLS— Guided missile launching system.

GMTR— Guided missile training round.

GUIDANCE SYSTEM– Keeps the missile on its proper flight path.

HERO— Hazards of Electromagnetic Radiation to Ordnance.

HIGH-PRESSURE (HP) AIR— Pneumatic air pressure ranging from 3,000 to 5,000 psi.

HSD— Heat sensing devices that are used in detection of slow or fast rise in temperature for automatic activation of magazine sprinkler systems.

HYDROSCOPIC— Explosives that easily absorbs moisture.

ICS– Integrated control station.

IFF— Identification friend or foe.

INITIAL VELOCITY (IV)— The speed at which a projectile is traveling at the instant it leaves the gun bore.

IPB— Illustrated parts breakdown is a publication that describes and illustrates all the components used in ordnance equipment.

LED— Light-emitting diode.

LIFT— The upward force that supports the missile in flight.

LOF— Line of fire is used to position the gun bore with respect to the LOS.

LOS— Line of sight is used to establish the present location of the target.

LOW-PRESSURE (LP) AIR— Pneumatic air pressure ranging up to 150 psi.

MACH NUMBER— The ratio of missile speed to the local speed of sound.

MAGAZINE AREA— The compartment, spaces, or passages on board ship containing magazine entrances that are intended to be used for the handling and passing of ammunition.

MAGAZINE— Any compartment, space, or locker that is used, or intended to be used, for the stowage of explosives or ammunition of any kind.

MAIN RELIEF VALVE— Protects the CAB unit from excessive pressure buildup and cavitation of the A-end.

MASTER REFERENCE PLANE (MRP)— The plane used as the machining reference to establish the foundation of the combat systems equipment. After initial construction, the MRP is only used as a reference plane following major damage or modernization.

MAXIMUM EFFECTIVE RANGE— The greatest distance at which a weapon maybe expected to fire accurately to inflict damage or casualties.

MAXIMUM RANGE— The greatest distance that the projectile will travel.

MCC– Main control console.

MEDIUM PRESSURE (MP) AIR— Pneumatic air pressure ranging from 151 to 1,000 psi.

MFCS— Missile fire control system.

MHE— Materials-handling equipment (industrial).

MODIFIED DOUBLE WEDGE— A supersonic fin shape that has relatively drag and is stronger.

MRC— Maintenance requirement cards.

NALC— Navy ammunition logistics code.

NEC— Navy enlisted classification code.

NEEW— The Net Equivalent Explosive Weight.

NPN— A transistor with the arrow that points away from the base.

NTDS— Naval tactical data system.

NWS— Naval Weapons Station.

OFFSET CENTER-LINE REFERENCE MARKS– Established during initial instruction to facilitate combat systems alignment. They are installed to prevent repeating center-line surveys during subsequent alignments.

OGIVE— The forward portion of a projectile.

OJT— On-the-job training.

ORDALTS— Authorized ordnance alterations.

ORTS— Operational readiness test system.

OSG— Order signal generator.

PA— System operating pressure ranging from 1,400 to 1,700 psi.

PC— Printed circuit card.

PDP– Power distribution panel.

PITCH— The turning rotation of a missile about its lateral axis.

PNP— A transistor with the arrow that points towards the base.

POWER OFF BRAKE— Stops the equipment movement during power failures, secures equipment movement against pitch and roll of the ship when system is inactive, provides for manual hand cranking during emergencies, installation, and maintenance.

PQS— Personnel qualification standards.

PREVENTIVE MAINTENANCE— The regular lubrication, inspection, and cleaning of equipment.

PRIMARY MAGAZINES— Ammunition stowage spaces, generally located below the main deck, and insofar as is practical, below the water-line.

PRIMERS— A device used to initiate the burning of a propellant charge by means of a flame.

PROPELLANTS— A device used to provide a pressure that, acting against an object to be propelled, will accelerate the object to the required velocity.

PRP— Pneumatically released pilot valve.

PYROTECHNIC— A device used for illumination, marking, and signaling.

Q-D— Quantity-Distance.

QUAL/CERT— Explosives-Handling Personnel Qualification Certification Program.

RANGE WIND— The wind that blows along the LOF, either with or against the projectile.

READY-SERVICE STOWAGE— Ammunition stowage facilities in the immediate vicinity of the weapon served.

READY-SERVICE MAGAZINES— Spaces physically convenient to the weapons they serve; they provide permanent stowage for part of the ammunition allowance.

RESERVOIRS— Used to dissipate heat, remove contamination, separate air, and store fluid in hydraulic systems.

RFI— Radio frequency interference.

RFI— Ready for issue.

ROLL— The rotation of a missile about the longitudinal axis.

ROTATING BAND— The circular band made of commercially pure copper, copper alloy, or plastic seated in a scored cut in the after portion of the projectile body.

RSR— Ready service rings.

SEPARATE-LOADING AMMUNITION— Ammunition that is gun sizes 8 inches and larger.

SEPARATED AMMUNITION— Ammunition that consists of two units-the projectile assembly and cartridge assembly.

SERVO PRESSURE— Hydraulic fluid pressure ranging from 400 to 500 psi.

SHIP BASE PLANE (SBP)— The basic plane of origin and is perpendicular to the CRP and includes the base line of the ship.

SIGHT DEFLECTION— The angle that the plane through the gun bore is deflected left or right from the LOS.

SIGHT ANGLE— The difference between the LOF and LOS and measured perpendicular to the trunnion axis.

SLIP RING— Provides a continuous electrical connection between the cabling of the stationary structure of the gun mount or launcher and a rotary joint for the cooling system piping.

SMALL ARMS— Any firearm with a caliber (cal.) of .60 inch or smaller and all shotguns.

SMS— Surface missile system.

STREAM— Standard tensioned replenishment alongside method.

SUPERCHARGE PRESSURE— Hydraulic fluid pressure up to 150 psi.

SUSTAINED RATE OF FIRE— The average number of rounds fired per minute with the number of minutes this rate can be sustained without damage to the weapon.

TDD— Target detection device.

THRUST— The force that propels the missile forward at speeds sufficient to sustain flight.

USCG— United States Coast Guard.

VAC— Volts of alternating current.

VDC— Volts of direct current.

VERTREP— Vertical replenishment by helo to ship.

VISCOSITY— The measurement of internal resistance to flow of fluids.

VLA— Vertical launch asroc.

VLA— Vertical launching system.

WARHEAD— The payload of the missile.

WCS— Weapons control system.

WDS— Weapons direction system.

WEAPON CONTROL REFERENCE PLANE (WCRP)— This plane is established during initial construction and used during alignment verification.

YAW— The turning of a missile about the vertical axis.

APPENDIX II

REFERENCES USED TO DEVELOP THIS TRAMAN

NOTE

Although the following references were current when this TRAMAN was published, their continued currency cannot be assured. You, therefore, need to ensure that you are studying the latest revision.

Chapter 1

Ammunition Afloat, NAVSEA OP 4, Commander, Naval Sea Systems Command, Washington, DC, 1988.

Identification of ammunition, NAVSEA SW010-AF-ORD-010, Commander, Naval Sea Systems Command, Washington, DC, 1990.

Navy Gun Ammunition, NAVSEA *SW030-AA-MMO-010,* Commander, Naval Sea Systems Command, Washington, DC, 1985.

Pyrotechnic, Screening Marking, and Countermeasure Devices, Volume 1, NAVSEA SW050-AB-MMA-010, Commander, Naval Sea Systems Command, Washington, DC, 1990.

Transportation and Storage Data for Ammunition, Explosives, and Related Hazardous Materials, Volume 2, NAVSEA SW 020-AC-SAF-020, Commander, Naval Sea Systems Command, Washington, DC, 1995.

United States Navy Ammunition, Historical and Functional Data, NAVSEA SW010-AB-GTP-010, Commander, Naval Sea Systems Command, Washington, DC, 1981.

United States Navy Ordnance Safety Precautions, NAVSEA OP 3347, Commander, Naval Sea Systems Command, Washington, DC, 1972.

Chapter 2

Ammunition Afloat, NAVSEA OP 4, Commander, Naval Sea Systems Command, Washington, DC, 1988.

Approved Harding Equipment for Weapons and Explosives, NAVSEA OP 2173, Volumes 1 and 2, Commander, Naval Sea Systems Command, Washington, DC, 1971.

Approved Handling Equipment for Weapons and Explosives, NAVSEA OP 2173, NAVAIR 19-100-1.1, Naval Sea Systems Command, Washington, DC, 1981.

Explosives-Handling Personnel Qualification and Certification (Qual/Cert) program, COMNAVSURFLANTINST 8023.4F/COMNAVSURFPAC-INST 8023.5B, Commander, Naval Surface Force, U.S. Atlantic Fleet, Norfolk, VA, and Commander, Naval Surface Force, U.S. Pacific Fleet, San Diego, CA, 1991.

Functional Introduction to Vertical Launching System Mk 41, NAVSEA SW394-AF-MMO-020/050VLS, Commander, Naval Sea Systems Command, Washington, DC, 1992.

Handling Ammuntion, Explosives, and Hazardous Materials with Industrial Materials-Handling Equipment (MHE), NAVSEA OP 4098, Commander, Naval Sea Systems Command, Washington, DC, 1978.

Identification of Ammunition, NAVSEA SW010-AF-ORD-010, Commander, Naval Sea Systems Command, Washington, DC, 1990.

Magazine Sprinkler Systems, NAVSEA S9522-AA-HBK-010, Commander, Naval Sea Systems Command, Washington, DC, 1989.

Navy Gun Ammunition, NAVSEA SW030-AA-MMO-010, Commander, Naval Sea Systems Command, Washington, DC, 1985.

Shipboard Ammunition Handling and Stowage, Naval Ship' Technical Manual, S9086-XG-STM-010, Chapter 700, Naval Sea Systems Command, Washington, DC, 1991.

Transportation and Storage Data for Ammunition, Explosives, and Related Hazardous Materials, Volume 2, NAVSEA SW 020-AC-SAF-020, Commander, Naval Sea Systems Command, Washington, DC, 1995.

Chapter 3

25MM M242 Automatic Gun, Description Operation and Illustrated Parts Breakdown (IPB), SW360-AB-MMO-010, Commander, Naval Sea Systems Command, Washington, DC, 1990.

U.S. Department of the Air Force, *Military Shotgun, 12 Gauge, Pump Action, Model 870,* TO 11W3-6-2-1, Secretary of the Air Force, Washington, DC, 1972.

U.S. Department of the Army, *Browning Machine Gun, Caliber .50 HB, M2,* Field Manual, FM 23-65, Headquarters, Department of the Army, Washington, DC, 1972.

U.S. Department of the Army, 40-MM *Grenade Launcher M79,* Technical Manual, TM 9-1010-205-10, Headquarters, Department of the Army, Washington, DC, 1985.

U.S. Department of the Army, *40-MM Grenade Launcher M79,* Technical Manual, TM 9-1010-205-24, Headquarters, Department of the Army, Washington, DC, 1972.

U.S. Department of the Army, *40-MM Grenade Launcher M303,* Technical Manual, TM 9-1010-221-10, Headquarters, Department of the Army, Washington, DC, 1984.

U.S. Department of the Army, *Machine Gun, 7.62-MM, M60,* Technical Manual, TM 9-1005-224-10, Headquarters, Department of the Army, Washington, DC, 1985.

U.S. Department of the Army, *Machine Gun, 7.62-MM, M60,* Technical Manual, TM 9-1005-224-24, Headquarters, Department of the Army, Washington, DC, 1987.

U.S. Department of the Army, *Machine Gun, 40-MM, Mk 19, Mod 3,* Technical Manual, TM 9-1010-230-10, Headquarters, Department of the Army, Washington, DC, 1991.

U.S. Department of the Army, *Mortar, 60MM, M224,* Technical Manual, TM 9-1010-223-10, Headquarters, Department of the Army, Washington, DC, 1987.

U.S. Department of the Army, *Mortar, 81-MM, M29A1,* Technical Manual, TM 9-1015-200-10, Headquarters, Department of the Army, Washington, DC, 1985.

U.S. Department of the Army, *Pistol, Caliber .45, Automatic, M1911A1,* Technical Manual, TM 9-1005-211-12, Headquarters, Department of the Army, Washington, DC, 1968.

U.S. Department of the Navy, *Pistol, semiautomatic, 9mm M9,* Technical Manual, Navy SW 370-AA-OPI-010/9mm, Headquarters, Department of the Navy, Washington, DC, 1990.

U.S. Department of the Army, *Revolver, Caliber .38 Special: Smith and Wesson Military and Police, M10, Technical Manual, TM 9-1005-206-14&P-1,* Headquarters, Department of the Army, Washington, DC, 1985.

U.S. Department of the Army, *Rifle, 5.56-MM, M16,* Technical Manual, TM 9-1005-249-10, Headquarters, Department of the Army, Washington, DC, 1985.

U.S. Department of the Army, *Rifle, 7.62-MM, M14,* Technical Manual, TM-9-1005-223-10, Headquarters, Department of the Army, Washington, DC, 1972.

U.S. Department of the Army, *Rifle, 7.62-MM, M14,* Technical Manual, TM 9-1005-223-20, Headquarters, Department of the Army, Washington, DC, 1972.

Chapter 4

Basic Machines, NAVEDTRA 10624-A1, Naval Education and Training Support Service, Washington, DC, 1988.

Compressed Air Plants and Systems, Naval Ships' Technical Manual, Chapter 551, Commander, Naval Sea Systems Command, Washington DC, 1987.

Fluid Power, NAVEDTRA 12964, Naval Education and Training Program Management Support Activity, Pensacola, FL, 1990.

Guided Missile Launching System Mk13 Mods 4, 5, 6, and 7 NAVSEA OP 4470, Naval Sea Systems Command, Washington, DC, 1991.

Guided Missile Launching System Mk26, SW394-HO-MMO-010, Naval Sea Systems Command, Washington, DC, 1986.

Chapter 5

5"/54-Caliber Gun Mount Mark 45 Mod 0, NAVSEA OP 3392, Volume 1, Commander, Naval Sea Systems Command, Washington, DC, 1973.

5"/54-Caliber Gun Mount Mark 45 Mod 1, Volume 1, Part 1, NAVSEA SW323-01-MMO-010, Commander, Naval Sea Systems Command, Washington, DC, 1985.

*76-mm 62-Caliber Gun Mount Mark 75 Mos 0 and 1, SW314-AO-*MMM-010/GM MK 75 0-1, Commander, Naval Sea Systems Command, Washington, DC, 1981.

Guided Missile Launching System Mk13 Mods 4, 5, 6, and 7 NAVSEA OP 4470, Naval Sea Systems Command, Washington, DC, 1991.

Navy Electricity and Electronics Training Series, Module 1, *Introduction to Matter, Energy, and Direct Current,* NAVEDTRA 172-01-00-79, Naval Education and Training Program Development Center, Pensacola, FL 1979.

Navy Electricity and Electronics Training Series, Module 2, *Introduction to Alternating Current and Transformers,* NAVEDTRA 172-02-00-85, Naval Education and Training Program Development Center, Pensacola, FL, 1985.

Navy Electricity and Electronics Training Series, Module 3, *Introduction to Circuit Protection, Control, and Measurement,* NAVEDTRA 172-03-00-85, Naval Education and Training Program Development Center, Pensacola, FL 1985.

Navy Electricity and Electronics Training Series, Module 16, *Introduction to Test Equipment,* NAVEDTRA 172-16-00-84, Naval Education and Training Program Development Center, Pensacola, FL, 1984.

Chapter 6

5"/54-Caliber Gun Mount Mark 45 Mod 0, NAVSEA OP 3392, Volume 1, Commander, Naval Sea Systems Command, Washington, DC, 1973.

5"/54-Caliber Gun Mount Mark 45 Mod 1, Volume 1, Part 1, NAVSEA SW323-01-MMO-010, Commander, Naval Sea Systems Command, Washington, DC, 1985.

*76-mm 62-Caliber Gun Mount Mark 75 Mods 0 and 1, SW314-AO-*MMM-010/GM MK 75 0-1, Commander, Naval Sea Systems Command, Washington, DC, 1981.

Clearing of Live Ammunition from Guns, NAVSEA SW300-BC-SAF-010, Commander, Naval Sea Systems Command, Washington, DC, 1985.

Chapter 7

Guided Missile Launching System Mk13 Mods 4, 5, 6, and 7 NAVSEA OP 4470, Naval Sea Systems Command, Washington, DC, 1991.

Guided Missile Launching System Mk26, SW394-HO-MMO-010, Naval Sea Systems Command, Washington, DC, 1986.

Guided Missile Launching System Mk41, SW394-AF-MMO-010, Naval Sea Systems Command, Washington, DC, 1991.

Guided Missile Training Round Mk60 Mod 6, SW850-A6-MMO-010, Naval Sea Systems Command, Washington, DC, 1984.

Tomahawk Weapons System Mk 36 and Mk 37 Block III SW261-DE-MM0-030/Tomahawk, Department of the Navy, Program Executive Officer, Cruise Missiles Project and Unmanned Aerial Vehicles Joint Project Office, Washington, DC, 1994.

Chapter 8

Guided Missile Launching System Mk13 Mods 4, 5, 6, and 7 NAVSEA OP 4470, Naval Sea Systems Command, Washington, DC, 1991.

Guided Missile Launching System Mk26, SW394-HO-MMO-010, Naval Sea Systems Command, Washington, DC, 1986.

Guided Missile Launching System Mk41, SW394-AF-MMO-010, Naval Sea Systems Command, Washington, DC, 1991.

Guided Missile Training Round Mk60 Mod 6, SW850-A6-MMO-010, Naval Sea Systems Command, Washington, DC, 1984.

Tomahawk Weapons System Mk 36 and Mk 37 Block III, SW261-DE-MM0-030/Tomahawk, Department of the Navy, Program Executive Officer, Cruise Missiles Project and Unmanned Aerial Vehicles Joint Project Office, Washington, DC, 1994.

Chapter 9

Safety Precautions for Standard Missile SM-1, SM-2, and VLS (MR & ER) Guided Missiles, Commander, Naval Sea Systems Command, Washington, DC, 1988.

*Tomahawk Weapons System Mk 36 and Mk 37 Block III SW261-DE-MM0-*030/Tomahawk, Department of the Navy, Program Executive Officer, Cruise Missiles Project and Unmanned Aerial Vehicles Joint Project Office, Washington, DC, 1994.

Chapter 10

Fire Controlman Third Class, NAVEDTRA 10276-1, Naval Education and Training Program Management Support Activity, Pensacola, FL 1988.

Guided Missile Training Round Mark 60 Mod 4, NAVSEA SW850-A4-MM0-010, Commander, Naval Sea Systems Command, Washington, DC, 1989.

Gunfire Control System (GFCS) Mk 86 Mods 8, 9, and 10, NAVSEA OP 4543, Volume 1, Commander, Naval Sea Systems Command, Washington, DC, 1982.

Maintenance Manual for Fire Control System Mk 92 Mod 2, Description, Operation, and Maintenance (U), SW271-C2-MMO-010/(C) Mk *92* Mod *2,* Volume 1, Part 1, Commander, Naval Sea Systems Command, Washington, DC, 1987.

Shipboard Electronics Material Officer, NAVEDTRA 10478-A1, Naval Education and Training Program Development Center, Pensacola, FL, 1982.

Chapter 11

Technical Manual for Theory of Combat Systems Alignment, SW225-AO-MMA-010/OP762, ALIGNTHEORY, Commander, Naval Sea Systems Command, Washington, DC, 1987.

Chapter 12

Basic Machines, NAVEDTRA 10624-A1, Naval Education and Training Program Management Support Activity, Pensacola, FL 1988.

Basic Military Requirements, NAVEDTRA 12043, Naval Education and Training Program Management Support Activity, Pensacola, FL, 1992.

Blueprint Reading and Sketching, NAVEDTRA 12014, Naval Education and Training Program Management Support Activity, Pensacola, FL 1988.

Fluid Power, NAVEDTRA 12964, Naval Education and Training Program Management Support Activity, Pensacda, FL 1990.

Lubrication of Ordnance Equipment, NAVSEA OD 3000, Commander, Naval Sea Systems Command, Washington, DC, 1978.

Ship Configuration and Logistics Support System, NAVSEA Technical Specification System, 9090-700A Commander, Naval Sea Systems Command, Washington, DC, 1988.

Technical Manual for Theory of Combat Systems Alignment, SW22S-AO-MMA-010/OP762, ALIGNTHEORY, Commander, Naval Sea Systems Command, Washington, DC, 1987.

Chapter 13

Combat Systems Readiness Review (CSRR), COMNAVSURFLANTINST 9093.1, Commander, Naval Surface Force, United States Atlantic Fleet, Norfolk, VA, 1984.

Conventional Ammunition Integrated Management System (CAMS), SPCC Instruction 8010.12, SPCC, Mechanicsburg, PA, 1992.

IM 3 & 2, NAVEDTRA 10193-D, Naval Education and Training Program Management Support Activity, Pensacola, FL 1986.

Operational Reports, NWP 10-1-10, Office of CNO, Washington, DC, 1987.

Physical Security Instruction for Conventional Arms, Ammunition, and Explosives, OPNAVINST 5530.13, CNO, Washington, DC, 1991.

Physical Security and Loss Prevention Manual, OPNAV Instruction 5530.14, CNO, Washington, DC, 1983.

Ships' Maintenance Material Management (3-M) Manual, Department of the Navy, Office of the Chief of Naval Operations, Washington, DC, 1987.

Standard Oganization and Regulations of the U.S. NAVY (SORN), OPNAVINST 3120.32, CNO, Washington, DC, 1987.

A

A-end, 4-21 to 4-24
Accumulators, 4-13 to 4-14
Actual GMLS power drives
  Mk 13 GMLS power drives, 4-51
  Mk 26 GMLS power drives, 4-51 to 4-56
Aegis weapons system, 10-8 to 10-9
Alignment principles
  alignment verification, 11-4
  bench mark, 11-5
  sequence of alignment, 11-1 to 11-4
  star checks, 11-5
  tram, 11-4
Ammunition
  ammunition classification, 2-1 to 2-3
  gun ammunition, 2-3
  lot/location card, 2-16
  lot numbers, 2-13
  projectiles, 2-3 to 2-6
  propelling charges, 2-6 to 2-9
  requisitions, 2-16
  serial/location card, 2-16
  stock record, 2-15
  transaction reports (ATR), 2-16, 13-16
Ammunition handling and safety
  ammunition safety, 2-39 to 2-42
  arrival conference, 2-31
  certification (Qual/Cert) program, 2-39
  electromagnetic radiation hazard, 2-42
  explosives-handling personnel qualification and handling equipment, 2-32 to 2-39
  inspection before accepting, 2-32
  loading/offloading plan, 2-31
  operating at night, 2-32
  quantity-distance (Q-D), 2-42
AN/SPY-l radar system, 10-10
Automatic (thermopneumatic) control system, 2-26
Automatic and semiautomatic firing systems
  blowback operated, 3-4
  gas operated, 3-3
Automatic and semiautomatic firing systems–Continued
  range and rate of fire, 3-5
  recoil operated, 3-4
  small-arms operating principles, 3-3
Automatic gun, 25-MM M242, 3-45 to 3-47

B

B-end, 4-24 to 4-25
Barrel maintenance
  afterfiring care, 12-22 to 12-23
  gauging, 12-23
  preparation for firing, 12-22
  tools used, 12-21 to 12-22
  weekly maintenance, 12-23
Battery alignment
  mount alignment, 11-7
  shipboard alignment, 11-7
  shipyard alignment, 11-6
  system alignment, 11-7
Bearings, 4-7 to 4-9
Bench mark, 11-5
Black powder, 1-6

C

Cab type of power drives
  A-end, 4-21 to 4-24
  B-end, 4-24 to 4-25
  control assembly, 4-30
  dual gear pump assembly, 4-25 to 4-26
  main relief valve, 4-28 to 4-30
  power off brake, 4-26 to 4-28
Calibration and repair test/measuring equipment
  equipment calibration status, 13-22
  metrology automated system, 13-19
  test equipment calibration, 13-18
Cams, 4-1
Casualty report system (CASREP)
  casualty categories, 13-12
  correct CASREP, 13-11

Casualty report system (CASREP)—Continued
message format, 13-13
types, 13-7
updates, 13-9
Characteristics of explosive reactions, 1-2
Circuit breakers, 5-10
Circuit elements, 5-1
Circuit failures
ground detection indicator, 5-26
types of circuit checks, 5-26
Color coding, marking, and lettering, 2-14
Combat systems readiness
combat systems readiness review (CSRR), 13-5
combat systems readiness test (CSRT), 13-5
Combat systems readiness review (CSRR), 13-5
Combat systems readiness test (CSRT), 13-5
Common maintenance procedures
hydraulic -seal replacement, 12-31
mechanical adjustments, 12-32 to 12-34
types of seals, 12-31 to 12-32
Control, 9-2
aerodynamic forces, 9-2 to 9-3
basic motions, 9-3 to 9-6
control surfaces, 9-6 to 9-8
gyroscopes, 9-4 to 9-6
Control circuits
logic circuit, 5-15 to 5-18
transistorized control circuits, 5-14 to 5-15
Conventional ammunition integrated management system (CAIMS)
lot/location card, 2-16
requisitions, 2-16
serial/location card, 2-16
stock record, 2-15
transaction reports (ATR), 2-16
Corrective maintenance management, 13-1 to 13-5
3-M systems' central data bank, 13-1
current ship's maintenance project, 13-1
publication applicability list (PAL), 13-4
ships technical publications system (STEPS), 13-4
system logs and records, 13-1
technical library, 13-2
technical manual identification numbering system (TMINS), 13-4
Corrective maintenance management-Continued
technical manual management program (TMMP), 13-4
Couplings, 4-4 to 4-7

D

Damage control PMS, 12-34 to 12-35
Detection process
electronic support measures, 10-2
naval tactical data system, 10-1
radar, 10-2
Dry-type sprinkler systems, 8-30 to 8-36

E

Electric motors, 5-54
Electrical symbols and reference designations, 5-12 to 5-14
Environmental control systems
air-conditioning and ventilation systems, 8-39 to 8-40
anti-icing systems, 8-38 to 8-39
Explosives
characteristics of explosive reactions, 1-2
high and low explosives, 1-1 to 1-2
initiation of explosive reactions, 1-3 to 1-6
service, 1-3 to 1-6

F

Final alignment and test, 11-9 to 11-11
Fire control
computer, 10-4
director and radar, 10-4
stable element, 10-4
Fire control problem
air, 10-6
ballistics, 10-5
drift, 10-7
earth rotation, 10-7
frames of reference, 10-7
gravity, 10-6
lead angles, 10-8
lines, 10-8

Fire control problem—Continued
parallax, 10-5
reference planes, 10-8
wind, 10-7
Fire control systems
aegis combat training system, 10-10
aegis display system, 10-10
aegis weapons system, 10-8 to 10-9
AN/SPY-l radar system, 10-10
command and decision system, 10-10
ex-optical sight, 10-12
fire control system, 10-10
Mk 160 gun computer system, 10-11
Mk 34 gun weapon system, 10-11
Mk 86 gun fire control system, 10-12 to 10-14
Mk 92 control system, 10-15 to 10-16
operational readiness test system, 10-10
weapons control system, 10-10
Fire suppression systems
dry-type sprinkler systems, 8-30 to 8-36
magazine sprinkling systems, 8-36 to 8-37
typical carbon dioxide (CO_2) system, 8-22 to 8-27
typical water injection system, 8-27 to 8-30
Firing cutout mechanisms, 11-7 to 11-8
Firing equipment (general), 6-9 to 6-11
Fuses, 5-2,9-18 to 9-20
fuse types and functioning, 2-10 to 2-12

G

GMLS safety summary, 8-40 to 8-43
carbon dioxide (CO_2) hazard, 8-42
explosion hazard, 8-42
high-pressure air hazard, 8-42
high-pressure nitrogen hazard, 8-42
high-pressure water hazard, 8-42
high-voltage, 8-42
hydraulic fluid hazard, 8-42
hydraulic pressure hazard, 8-42
launcher area hazard, 8-42
live missile hazard, 8-42
moving equipment, 8-42
servicing, adjusting hazard, 8-42
specific safety precaution, 8-42
Grenade launchers
40-MM M203, 3-53 to 3-55
40-MM M79 grenade launcher, 3-48 to 3-50
Mk 19 Mod 3 machine gun, 3-50 to 3-53
Guidance
command guidance systems, 9-9 to 9-10
composite guidance systems, 9-11 to 9-12
homing guidance systems, 9-10 to 9-11
phases of guidance, 9-8 to 9-9
self-contained guidance systems, 9-12
Gun components
5"/54 Mk 45 Mod 0 gun mount power drive, 6-2 to 6-9
Mk 75 76MM positioning equipment, 6-9
positioning equipment, 6-1 to 6-9
Gun operation and misfire procedures, 6-23 to 6-24
Gun systems, 6-12 to 6-22
5"/54 Mk 45 gun, 6-13 to 6-18
76-MM Mk 75 gun, 6-18 to 6-22
Gyroscopes, 9-4 to 9-6

H

Hand grenades
procedures for throwing, 3-60
safety, 3-60
types and characteristics, 3-59
Handguns
.38-caliber revolver, 3-14 to 3-15
9-MM M9 semiautomatic pistol, 3-10 to 3-14
M1911A1 .45-caIiber semiautomatic pistol, 3-5 to 3-10
High and low explosives, 1-1 to 1-2
Hydraulic machines
fluid characteristics, 4-9
hydraulic mechanisms, 4-16 to 4-17
system components, 4-10 to 4-16
Hydraulic-mechanical operation of a launcher component
center guide hydraulic components, 4-18
extend center guide operation, 4-19
retract center guide operation, 4-19
Hydraulic system
Mk 45, 5-inch 54, 4-45 to 4-51
Mk 75, M62, 76-MM, 4-31 to 4-44

I

Identification of ammunition
ammunition lot numbers, 2-13
color coding, marking, and lettering, 2-14
Indicators lights, 5-1

J

Jettisoning
functional description, 8-3 to 8-4,8-6
Mk 13 Mod 4 GMLS jettison, 8-1 to 8-3
Mk 26 GMLS jettison, 8-4 to 8-6

L

Landing-party equipment, 3-61 to 3-62
Levers and linkages, 4-4
Light antitank weapon system (LAW), 66-MM M72, 3-55
Logic circuits, 5-15 to 5-18
Lubricants and corrosion control, 12-10 to 12-21
alternates and substitutes, 12-18
corrosion control, 12-19 to 12-21
fittings, 12-15 to 12-16
function of lubricants, 12-12
lubricating tools, 12-13 to 12-15
lubrication charts, 12-16 to 12-18
lubrication symbols, 12-18
qualities of lubricants, 12-10 and 12-12
specifications, 12-12 to 12-13
stowage of lubricants, 12-18 to 12-19

M

M14 rifle, 3-16 to 3-20
M16A1 rifle, 3-20 to 3-25
M1911A1 .45-caliber pistol, 3-5 to 3-10
M60, 7.62-MM machine gun, 3-36 to 3-44
M72, 66-MM light antitank weapon system (LAW), 3-55
Machine guns
.50-caliber browning machine gun, 3-34 to 3-36
20-MM Mk 16 Mod 5 machine gun, 3-44 to 3-45
25-MM M242 automatic gun, 3-45 to 3-47
7.62-MM M60 machine gun, 3-36 to 3-44
Magazine alarms system, 2-30
Magazine sprinkler system
automatic (thermopneumatic) control system, 2-26
hydraulic control system, 2-24 to 2-26
magazine alarm system, 2-30
magazine sprinkler control valves, 2-23
Magazine sprinkling systems, 8-36 to 8-37
Magazine types, 2-18
Magazines
inspection of magazines, 2-20
magazine designation, 2-19
magazine security, 2-19
magazine types, 2-18
Main relief valve, 4-26 to 4-28
Main relief valve, 4-28 to 4-30
Maintenance tools
decoppering, 12-23
hand tools, 12-23
measuring tools and gauges, 12-24
nonsparking tools, 12-25
power tools, 12-23
pressure gauges, 12-26
rules applicable to repair tools before a job, 12-25 to 12-26
special tools, 12-25
torque wrenches, 12-24 to 12-25
Mechanical devices
bearings, 4-7 to 4-9
cams, 4-1
couplings, 4-4 to 4-7
gear trains, 4-2 to 4-4
levers and linkages, 4-4
Missile handling
containers, canisters, and handling equipment, 2-45 to 2-63
replenishment methods, 2-63 to 2-67
weapons station processing, 2-43 to 2-44
Missiles aboard ship
cleaning and preservation, 2-69
handling, 2-67
inspections, 2-68
stowage, 2-68
M9, 9-MM pistol, semiautomatic, 3-10 to 3-14

Mk 13 Mod 4 and 7 GMLS
base ring, 7-10
capabilities, 7-2 to 7-4
carriage, 7-8 to 7-10
harpoon warm-up power, 7-17
hoist assembly, 7-15
launcher guide, 7-4 to 7-8
launching system control, 7-17 to 7-21
magazine, 7-10 to 7-16
Mk 13 Mod 4 GMLS, 7-4 to 7-16
Mk 160 gun computer system, 10-11
Mk 26 GMLS and Mods
auxiliary equipment, 7-41 to 7-42
launcher, 7-32 to 7-34
launcher hydraulic systems, 7-34
launching system control, 7-35 to 7-41
magazine, 7-24 to 7-32
purpose and capabilities, 7-22 to 7-24
Mk 26 GMLS and Mods, 7-22 to 7-41
Mk 34 gun weapon system, 10-11
Mk 41 vertical launching system (VLS)
5-cell strikedown module, 7-48 to 7-50
description and capabilities, 7-43 to 7-46
fault processing, 7-50
gas management system, 7-50
launcher control units (LCU), 7-46
launcher support equipment, 7-50
power distribution, 7-50
remote launch enable panel (RLEP), 7-46
status panel, 7-46
vertical launchers, 7-47 to 7-48
Mk 41 vertical launching system, 7-43 to 7-50
Mk 45 gun mount control system, 5-59 to 5-83
Mk 45, 5-inch 54 gun, 6-13 to 6-18
Mk 45, 5-inch 54 hydraulic system, 4-45 to 4-51
Mk 75 gun mount control system
anti-icing system, 5-44 to 5-47
auxiliary systems, 5-48 to 5-51
barrel cooling control panel, 5-43 to 5-44
gun control panel (GCP), 5-27 to 5-43
slip ring assembly, 5-48
Mk 75 gun, 76-MM, 6-18 to 6-22
Mk 75 train and elevation system, 5-51 to 5-59
Mk 86 gun fire control system, 10-12 to 10-14
Mk 87 line-throwing adapter kit, 3-30 to 3-33
Mk 87 Mod 1 line-throwing rifle adapter kit, 3-30 to 3-33
canister, 3-31
chemical light wand, 3-31
grenade cartridges, 3-32
launcher, 3-30
maintenance, 3-33
preparation for firing, 3-33
projectile, 3-30
recoil pad, 3-32
shotline, 3-33
Mk 92 control system, 10-15 to 10-16
Mortar, 88-MM, 3-56
Mossberg M500 shotgun, 3-30
Multibase powder, 1-7

N

Nitrocellulose (NC), 1-6

O

Ordnance drawings
hydraulic diagrams, 12-30
illustrated parts breakdown, 12-29 to 12-30
parts numbers, 12-30
types of drawings, 12-28 to 12-29
Ordnance management system, 13-14 to 13-17
ammunition transaction reporting, 13-16
CAIMS reporting, 13-14
item tracking, 13-17
SPCCINST P8010.12, 13-15
Ordnance safety, 1-22 to 1-23

P

Payloads (warheads), 9-17
Physical security of classified material, 13-25 to 13-28
care during working hours, 13-26
care of working spaces, 13-26
custodians, 13-25
destruction of classified material, 13-28
reproduction of classified material, 13-27
securing classified material, 13-26
storage of classified material, 13-26

Pistol, 9-MM M9 semiautomatic, 3-10 to 3-14
PMS management
shipboard evaluation of PMS, 12-35
type commander evaluation of PMS, 12-36
Power drives and control circuit components, 5-1 to 5-14
circuit breakers, 5-10
circuit elements, 5-1
electrical symbols and reference designations, 5-12 to 5-14
fuses, 5-2
indicator lights, 5-1
relays, 5-7 to 5-10
solenoids, 5-10 to 5-12
switches, 5-2 to 5-7
Power off brake, 4-26 to 4-28
Prefire requirements (general), 6-11 to 6-12
Preventive and corrective maintenance, 12-2 to 12-11
corrective maintenance, 12-2 to 12-3
maintenance by ship's force, tender and navy yard, 12-4
maintenance planning, 12-3
maintenance skills, 12-3
overhaul maintenance requirements, 12-9 and 12-11
overhaul work packages, 12-4 to 12-6
phased maintenance program, 12-7 to 12-9
plan maintenance schedules, 12-3
preventive maintenance, 12-1 to 12-2
ship's force overhaul management system, 12-6 to 12-7
system preventive maintenance, 12-3
Projectiles types, 2-3 to 2-6
Propelling charges, 2-6 to 2-9
Propulsion, 9-12
acceleration, 9-16
math numbers and speed, 9-16
reaction propulsion, 9-13
solid-fuel rocket motors, 9-14 to 9-16
turbojet engines, 9-13
Pyrotechnics
distress and hand signals, 1-17
marine illumination and smoke signals, 1-11
pistols, 1-14
Pyrotechnics-Continued
pyrotechnic marine location markers, 1-11
pyrotechnic safety handling and stowage, 1-21

Q

Quality assurance
calibration of test and measuring equipment, 12-38
organization and responsibilities, 12-37
quality deficiency reporting, 12-38

R

Radar alignment, 11-8 to 11-9
Relays, 5-7 to 5-10
Remington M870 shotgun, 3-25 to 3-30
Replenishment methods, 2-63 to 2-67
Revolver, .38-caliber, 3-14 to 3-15

S

Safe and arm device, 9-20
Safety
air systems, 4-58
high-pressure safety rules, 4-57
hydraulic fluid precautions, 4-58
personnel safety precautions, 4-58
Safety, 12-38 to 12-41
Service explosives, 1-6 to 1-8
black powder, 1-6
booster explosives, 1-8
main-charge (burster) explosives, 1-8
Multibase powder, 1-7
nitrocellulose, 1-6
primary (initiating) explosives, 1-8
single-base powder, 1-7
smokeless powder, 1-7
Ship's power and distribution, 5-88 to 5-90
Shipboard ammunition inspection, 2-17
Shotguns
Mossberg M500 shotgun, 3-30
Remington M870 shotgun, 3-25 to 3-30
Shoulder weapons
M14 rifle, 3-16 to 3-20
M16A1 rifle, 3-20 to 3-25

Single-base powder, 1-7
Small-arms fundamentals
cycles of operation, 3-1 to 3-3
small-arms nomenclature, 3-1
Small-arms maintenance, 3-58
Small-arms range duties, 3-59
Smokeless powder, 1-7
SMS guided missiles, 9-20 to 9-24
Solenoids, 5-10 to 5-12
Solid-fuel rocket motors, 9-14 to 9-16
Solid-state control circuit operation, 5-83 to 5-88
Sources of maintenance information
ordnance publications, 12-26 to 12-27
Special precautions for small arms, 3-58
Star checks, 11-5
Stowage and issue of small arms, 3-58
Strikedown, 8-7 to 8-22
Mk 13 Mod 4 GMLS strikedown, 8-7 to 8-10
Mk 26 GMLS strikedown/intertransfer, 8-10 to 8-15
Mk 41 vertical launching system, 8-16 to 8-22
Structure of a missile, 9-1 to 9-2
Support weapons
40-MM M203 grenade launcher, 3-53 to 3-55
66-MM M72 series light antitank weapon (LAW) system, 3-55
88-MM mortar, 3-56
Switches, 5-2 to 5-7
Synchro circuits, 5-18 to 5-25
advantages of synchros, 5-18
basic principles of synchros, 5-20 to 5-22
classification of synchros, 5-19
electrical zero, 5-23
maintaining and troubleshooting synchro systems, 5-24 to 5-25
purpose of synchros, 5-18
synchro system, 5-23
synchros symbols, 5-19

T

Technical manual identification numbering system (TMINS), 13-4
Technical manual management program (TMMP), 13-4
Torque wrenches, 12-24 to 12-25
Training
assist visits, 13-29
formal training, 13-28
GMT, 13-29
informal training, 13-29
management of training, 13-31
OJT, 13-29
planning board for training, 13-31
PQS, 13-30
records, 13-36 to 13-39
Training missiles, 10-23 to 10-26
general purposes, 10-23
inspections, 10-25
servicing, 10-26
standard GMTR, 10-23 to 10-25
Training plans
long-range plan, 13-32
monthly training plan, 13-35
quarterly-plan, 13-32
short-range plan, 13-32
weekly training plan, 13-35
Tram, 11-4
Transistorized circuits, 5-14 to 5-15
Turbojet engines, 9-13
Typical carbon dioxide (CO_2) system, 8-22 to 8-27
Typical water injection system, 8-27 to 8-30

W

Warheads
fuzes, 9-18 to 9-20
payloads, 9-17
safe and arm device, 9-20
Weapons direction systems, 10-2 to 10-3
Weapons system maintenance
daily system operability test, 10-21 to 10-22
OCSOT, 10-22
system testing, 10-17
testing requirements, 10-17 to 10-21